



International periodic scientific journal

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*Indexed in:
RSCI (PIHL) SCIENCE INDEX
INDEXCOPERNICUS*

SWORLD
Journal

ISSN 2227-6920

Issue №12
March 2017

Published by:

Scientific world, Ltd.

With the support of:

Moscow State University of Railway Engineering (MIIT)

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Author(s), "Title of Paper," in SWorld Journal, Issue №12 (Scientific world, Ivanovo, 2017) – URL:
<http://www.sworldjournal.com/e-journal/j13.pdf> (date:...) - page - Article CID Number.

Published by:

Scientific world, Ltd.

Ivanovo, Russia

e-mail: orgcom@sworld.education

site: www.sworldjournal.com

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**BIOLOGY****j12-024****DOI: 10.21893/2227-6920.2017-12.024****UDC 602.3:579.873.7****RESEARCHING OF ANTIBACTERIAL AND ANTIFUNGAL ACTIVITY OF
AVERMECTIN COMPLEX ON THE BASE OF *STREPTOMYCES******AVERMITILIS* STRAINS****ДОСЛІДЖЕННЯ АНТИБАКТЕРІАЛЬНОЇ ТА АНТИФУНГАЛЬНОЇ
АКТИВНОСТІ АВЕРМЕКТИНОВОГО КОМПЛЕКСУ ШТАМІВ*****STREPTOMYCES AVERMITILIS*****Bachelor Iskra K.O.¹****Ph.D., Zhytkevych N.V.²****Ph.D., associate professor, Boroday V.V.¹**¹*National University of Life and Environmental Sciences of Ukraine,*²*Institute of Microbiology and Virology*

*Abstract. The purpose of article was to make a literature review of not only insecticidal and anthelmintic properties of avermectins, but also their ability to inhibit the growth and development of other bacteria and fungi, including phytopathogenic. The article gives of the bacteria *Streptomyces avermitilis* brief characteristics, determines the features of avermectines complex, lists the types of avermectins, explains the main features of avermectins. The authors have carried out monitoring of the sources to identify information about new properties of avermectines complex, such as antibacterial and fungicidal activity. The article provides information about recent studies and perspectives in this area.*

*Key words: *Streptomyces avermitilis*, avermectin complex, anthelmintic action, ivermectin, moxidectin, selamectin, *Mycobacterium tuberculosis*, antimicrobial activity.*

Research of *Streptomyces avermitilis*, its new strains and their characteristics can be used for plant protection, because detection of avermectins antibacterial and antifungal properties will give the motion to the production of drugs with a wider spectrum of action, which will affect the improvement of agricultural products. There



are a lot of scientific investigations about anthelmintic and insecticidal activity of avermectin complex, but at the moment there are very a few academic works focusing on this topic, so the study of antifungal and antibacterial activity of avermectines complex is a very important and promising.

Streptomyces avermitilis is a soil actinomycete, Gram-positive bacteria, that belongs to the genus *Streptomyces*. Like other members of this genus, *S. avermitilis* it is widely used as a microorganism - producer. Different strains of these bacteria are used in biotechnology, microbiology, veterinary, plant protection and other industries. The *S. avermitilis* is specialized for production of secondary metabolites, which are presented as avermectin complex [1].

Avermectins are a complex of macrocyclic lactone derivatives which can be classified into Avermectin B1a, B1b; Doramectin, Emamectin B1a, B1b; Eprinomectin B1a, B1b; Emamectin B1b, Ivermectin B1a, Ba1; Eprinomectin B1b, Ivermectin, Selamectin and other [2].

All aware of the fact that the drugs that contain, avermectin, is used as anthelmintic, antimicrobial, insecticidal agents. However, in recently conducted research to identify and antifungal antibacterial activity of the complex [2].

At the moment this type of action avermectin complex are still poorly understood. This question is examined by scientists from Japan, USA, India and other countries where biotechnology is developing successfully. So it was revealed that avermectin have not only insecticidal and anthelmintic action, but also have influence on the growth and development of pathogenic bacteria.

Scientists have conducted a study, which confirmed that ivermectin allocated *Streptomyces avermitilis* capable of destroying (killing) the bacteria *Mycobacterium tuberculosis*. They also had a significant impact on bacteria, such as: *M. smegmatis*, *M. avium*, *M. bovis*, *Rhodococcus jostii*. Researchers discovered that derivatives of avermectin, such as moxidectin and selamectin, that are commonly used for the treatment of diseases caused by parasites in animals, they are also highly active against *Mycobacterium tuberculosis* [3].

In India during the study of antimicrobial activity of ivermectin microbiologists



discovered their ability to inhibit the growth and development of *Chlamydia trachomatis* [4]. Similarly, abamectin has antibacterial activity against *Micrococcus luteus* [5].

In general, the researchers came to the conclusion that the activity of the complex avermectin increases with their concentration. However, since at high concentrations, avermectin have a negative impact on the microflora and the object as a whole, making it toxic, the scientists are now looking for solutions to this problem.

Also, now scientists are exploring the bactericidal effect of complex avermectins to other bacteria, particularly pathogenic bacteria of plant.

About antifungal activity avermectines complex information is even less. At the moment, only abamectin used for the treatment and prevention of fungal infections in animals, particularly dogs. Unfortunately, the pure avermectin does not show fungicidal activity and does not affect their metabolism. Avermectin only in conjunction with oligomycin can cause some impact, but it's hardly visible. However, it was discovered that the isolate *S. avermitilis* MA-5856, unlike its predecessors, produces substances that can inhibit the activity filamentous fungi [5].

At the moment, researching is being conducted on the topic of the use of metabolic drugs based on soil *Streptomyces* by Ukrainian scientists from National Academy of Sciences of Ukraine. Already it has been discovered that the anti-parasitic drug Averkom, that is developed on the basis of the strain *Streptomyces avermitilis* UKM Ac-2179, not only suppress the development of plant parasitic nematodes, but also reduces the incidence of plants with late blight [6].

Moreover, it was revealed by the experience of the action of avermectin isolated from *Streptomyces avermitilis* on the wheat that the drug reduced the level of infection of plants of spring wheat root rots and parasitic nematodes of plant [6].

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**j12-005****DOI: 10.21893/2227-6920.2017-12.005****MEDICAL-SOCIAL CHARACTERISTIC AND ANALYSIS OF HORMONAL STATUS OF GIRLS WITH ACNE IN VINNITSIA**

c.b.s., as.prof. Gudzewytch L.S./ к.б.н., доц. Гудзевич Л.С.

m.sc. Kuts B.A./ студент-магистр Куц Б.А.

*Vinnitsia Pedagogical University, Vinnitsia, Ostrozkuu 32, 21000**Винницкий государственный педагогический университет, Винница, ул.Острозкого 32, 21000*

Abstract. In this paper we describe the results of the research of hormonal balance characteristics of teenagers in period of somato-sexual development showed that hormonal diagnostic gives the opportunity to find the ornery indications and causes of unfavorable effects caused by medical-social factors. In the article showed also the influence on the genesis of problems with health own hormonal disfunctions, relations between the genesis of hormonal infraction in different geographic regions of Ukraine and the perspective of normativ hormon level modeling. The difference between sexes and non-equality of hormon level in boys and girl, girls with illness and healthy girls organisms in puberty were found. The universally recognised fact is the influence on changes of cortisol, prolactin, sexul steroides, tireotropin levels among patients with fat mass, poor mass, alcoholism in some regions of Ukraine and other concomitant diseases in period of teenage making. It is worth to consider the rates of individual well-being and already today to hammer the improvement of life quality for teenagers.

Key words: teenagers, girl, hormonal status, hormones, somato-sexual development, factors.

Introduction.

Today there are unfavorable demographic tendencies: the high level of morbidity among juvenile population are kept, increases the level of chronical illnesses, the amount of teenagers that belong to the medic-sociable high-riskgroups increasesas well [7]. Not an exception are dermatosis and cosmetology pathologies of



teenagers.

On the basis of deep analysis of distribution of dermatosis and cosmetology diseases, risk, terms and lifestyle, estimation of life and medical help quality of this category of patients allowed to work out the complex of the recommendations for the improvement of profilaction help.

Hormonal diagnostics, or determination of hormonal status of patients occupies an important place in the exception of secondary reasons and establishing of the relations between causes and outcomes of the those or other illnesses origin. For example, universally recognized is the fact of influence different changes of pregnenetrioldione, prolactine, sexual steroids, thyrotropine level among patients with obesity [14,15].

Teens is the special group, as during puberty period there are not only the reproductive, social, emotional, cognitive ripening that can in it's own turn cause not only psychosomatic discomforts but also alteration of the endocrine system of young people, that is in the state of somat-sexual changes, changes in the different phases of cycle (among girls) and others [8,9].

The study of this question shows the connection between the processes of acceleration and physical, somatic and psychical changes in dependence on the periods of ontogenesis and different factors, including dependences even in geographical coordinates or ethno-cultural groups [10,12].

Today an exposure of intercommunication between somatic indexes and sexual development is perspective, and the modeling of indexes of sexual hormones' level can be widely used with the aim of diagnostics, establishment of differences between patients and healthy people [5]. It makes actual the exposure of age-old, sexual features, and afterwards also population and racial standards for the habitants of any region of Ukraine, as well as Podillya.

The main text

Fortoday it is difficult to define general norms of development of teenagers, as a juvenile health is hard for an objective estimation, however norms are necessary for passing of forming of pathological changes, prophylaxis of the loss of natural health.



Instead of this the indexes of the state of the separate systems and organs are basic for the estimation of conformities to law of development and height in a puberty period, that grade according charts of age-old division into periods of ontogenesis of human, that was accepted on th VII All-union conference on the problems of age-old morphology, physiology and biochemistry of APS USSR.

Using based on the data about life, environment, behavior, activity that show adolescents in the treatment and maintenance of their health on the proper level we can make medical and social characteristics of young people not only a city or region, but also throughout the country. Because of the condition of the body can be seen only when the criteria are aware of the rules is for the individual in a state of biological and social wellbeing [2,13].

The comparative analysis of morbidity and pathological affection teenagers revealed that there is a high prevalence of skin and subcutaneous tissue, dominated acne (35.8%), on the second place - dermatitis (seborrheic, contact, atopic)-30.4 %, the third one - teenagers with acne - 13.6%.

According to the research figures concentrations of somatotropin among adolescents with gastrointestinal disorders reliable difference between the children: sick and healthy - $1,52 \pm 0,52$ ng/ml and $1,55 \pm 0,47$ ng/ml, respectively, is not shown. The majority of patients (88.33%) had hormone concentrations within the normative values, but in 14 (11.67%) persons subnormal growth hormone level value (0,77-0,98 ng / mL) is responsible. Reducing STG was recoded among boys with disorders, that can be an evidence of unfinished somato-sexual development at the age of 14-17 years.

The increased body mass index of teenagers, abdominal fat distribution and insulin resistance was significantly positively associated with concentrations of cortisol, thyrotropin, prolactin that make an influence on the metabolic complications, etc.[11].

What about regional peculiarities, on the territory of Vinnitsa according to our own data because of the drinking alcoholic there are no correlations between changes in somato-sexual development indicators, but among adolescents 16-19 years old in



Poltava there were found the deviations in the process of maturing in 87.7%.

The study of hormonal regulation of somatic and sex among surveyed teens revealed some differences in their hormonal status comparing with normative values (low testosterone levels, low estradiol abnormally elevated concentrations of progesterone, the normal content of cortisol, a substantial disorder of ratios, meaning coefficients) [4,6].

Biomedical risk factors for hereditary disorders cover functions of the reproductive system noninflammatory genesis, young maternal age at the time of delivery, concomitant extragenital, early or late menarche, obesity or body weight deficit, surgery with anesthesia support. The influence of risk factors is different for girls and rural residents and for different kinds of already acquired diseases: all girls with SA (secondary amenorrhea) and 87.5% with OM and PUB (oligomenorrhea and pubertal uterine bleeding) among which concomitant extragenital with autonomic dysfunction, asthenic-neurotic syndrome, digestive system diseases and systemic connective tissue dysplasia are often diagnosed [3,6]. The causes of disorders in adolescence is a metabolic secretion of insulin, which often entails a hyperprolactinemia, which caused by reduction of assimilation function and the synthesis of sex hormones (61.9% and 85.7% in boys and girls respectively) [1], it was confirmed by own studies of adolescents, who often have hyperglycemia.

The study was conducted on 25 girls with different kinds of acne, with disease' duration until 1 month up to 2 years, with a history of acne from their parents, and parents without it, aged 12 to 15 years. The monitoring group was represented almost 25 healthy girls without signs of acne between the ages of 12-15 years. We determined the content of the plasma follicle-stimulating (PFS), luteinizing hormone (LH) and such hormones like estradiol (E), prolactin (PL), progesterone (PR) and testosterone (T)).

According to the research performance of progesterone among girls with acne patients was not significantly different from healthy indicator ($p > 0.05$). According to our studies, all the girls had different clinical stages of acne the increase of testosterone standards and decrease of estradiol level. This imbalance deepened



appropriate to clinical stages parallel to the severity of acne. However, patients with acne, who free testosterone index (60%) had a much greater quantitative measure of reliability ($p < 0.05$) than the general rate of testosterone (16%) were virtually no different between the level indicators in almost all causes among healthy girls. The majority of teen girls (21 people, 84%) had total testosterone concentration within the normative values, but 4 of them (16%) had responsible subnormal level of the vehicle value. Indicators of body masculinisation among adolescent patients grew parallel deepening severity of the clinical picture of acne. Thus, the research confirms the pathogenic role of hiperandrogenisation and hipoestrogenisation in the mechanisms of acne among young woman.

Summary and Conclusions.

The analysis gave us an opportunity to find the dependence between the hormonal balance of adolescents and somato-sexual development that may be caused by medical and social factors, concomitant diseases (alcohol addiction, obesity, diabetes, etc.), heredity, countryside living and the body teenager's changes in puberty. This gives grounds for more detailed regulation of standards in determining the level of sex hormones and the result's using as useful data bank in the study of various diseases in adolescent group, in creating would enabling environment, improving the quality of life and developing practical recommendations aimed on getting better prevention help adolescents with disorders and cosmetic dermatology.

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Анотація

Результати досліджень особливостей гормонального балансу підлітків в період сомато-статевого розвитку показали, що гормональна діагностика дає змогу виявити опосередковані ознаки та причини несприятливих наслідків дії факторів медико-соціальної групи. Показано також вплив на виникнення проблем зі здоров'ям самих гормональних дисфункцій, залежність виникнення гормональних порушень в різних географічних регіонах України та перспективність моделювання нормативних показників вмісту гормонів. Виявлено також відмінність у між статевому аспекті та нерівнозначність концентрації гормонів в організмі дівчат та хлопців у пубертатному періоді. Загально визнаним є факт впливу зміни рівня кортизолу, пролактину, статевих стероїдів, тиреотропіну у пацієнтів з ожирінням, недостатньою масою тіла, алкоголізмом в певних регіонах та іншими супутніми захворюваннями в період підліткового становлення. Для визначення норм варто враховувати показники індивідуального благополуччя та вже зараз працювати над покращенням якості життя підлітків.

Ключові слова: підлітки, дівчата, гормонольний статус, гормони, сомато-статеве дозрівання, фактори.

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Supervisor: **c.t.s., as.prof. Gudzewytch L.S.**

This article was prepared within the framework of the Master Diploma's

Research paper

Article sent: 14/03/2017 of

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**j12-020****DOI: 10.21893/2227-6920.2017-12.020****ASSESSMENT OF AIR POLLUTION BY THE TEPLOOZERSKY CEMENT
PLANT****ОЦЕНКА ЗАГРЯЗНЕНИЯ АТМОСФЕРНОГО ВОЗДУХА
ТЕПЛООЗЕРСКИМ ЦЕМЕНТНЫМ ЗАВОДОМ****с.б.с Turbina E.S./ к.б.н. Турбина Е.С.***Sholom-Aleihem Priamursky State University, Russia, Birobidjan, shirokaya Street 70-a, 679000.**ФГБОУ ВПО «Приамурский государственный университет имени Шолом-Алейхема»,**Россия, г. Биробиджан, Широкая 70-а, 679000*

Abstract. The author analyzes the amount of suspended solids in snow cover, determined by the snow survey method at the end of winter, when the concentration of pollutants in the snow reached the maximum values, in the territories located at different distances from the Teploozersky cement plant. The sampling points were located mainly in the village and around the proposed zone of maximum contamination. It is shown that the plant pollutes adjacent territories at a distance of more than 3 km from its main pipe, while the maximum pollution level is noted in the kilometer zone and depends on the wind regime. The analysis of the obtained data indicates a high level of dustiness in the atmospheric air in the village of Teploe ozero.

Key words: atmospheric air, suspended matter, snow shooting, cement plant, air pollution.

Emissions of cement production enterprises significantly affect both the state of the environment and the health of the population living in the contaminated area [4]. It is known that the gas-dust mixture of emissions from cement industry enterprises, with long-term exposure to the population, leads to a general decrease in immunity and promotes the development of such diseases as chronic bronchitis, peptic ulcer, bronchial asthma, chronic pyelonephritis and cancer [2]. If a cement dust enters the eye, the risk of conjunctivitis and necrosis of individual parts of the connective membrane increases, in severe cases, the perforation of the eyeball may occur [4].



Teploozersk is a city-type settlement located in the north of the Jewish Autonomous Region of Russia. The area of the village is 2147 square kilometers. The population is about 3800 people. The main stationary source of air pollution in the village is "Teploozersky Cement Plant".

The Teploozersky Cement Plant is the main source of gas-dust pollution, both in the area of the enterprise itself and in the surrounding areas, which annually supplies to the atmosphere more than 3.8 thousand tons of pollutants, the main of which are suspended substances (SS), including portland cement dust [1].

The purpose of our research was to assess the dust pollution of the territory of the village of Teploe ozero in order to identify the territories that are most dangerous to public health.

To achieve this goal, a snow survey was conducted. Snow shooting is a way of studying the state of snow cover on a certain network of points, on which samples of snow are taken.

Samples were taken at the end of winter before the beginning of snow melting, when the concentration of pollutants in the snow reached the maximum values. The concentration of suspended solids (SS) was determined in the samples. The sampling points were located mainly in the village and around the proposed zone of maximum contamination. The location of the pipe, which diverted the furnaces from the gas-dust by-products of production, was accepted as the source of pollution.

Sampling was carried out in three zones, located at different distances from the source of pollution (plant pipe). Zone 1 (Zavodskaya /Plant), including both the territory of the plant itself with a sanitary protection zone, and part of the territory of residential development in the village of Teploozersk, is removed from the pollution source up to 1 km. Zone 2 (Residential area), is removed from the factory pipe from 1 to 2 km. This territory includes the most part of residential development (more than 80% of the total population of the village), with socially important facilities (hospital, school, kindergarten, etc.). Zone 3 (area of homestead plots), is located from the plant at a distance of 2 to 3.7 km.

In addition, six control samples were taken (the average amount of SS in them

was 1.2 kg / ha per month) at a distance of 8 to 15 km from the village in a forest zone remote from roads and other sources of pollution.

Samples were selected for the entire thickness of the snow cover by the "envelope method". In each sample the amount of SS was determined. Then, the calculation of atmospheric deposition of SS per 100 cm³ of snow and average values for 1 month kg/ha was carried out by mathematical means. The data obtained are shown in Figures 1, 2, 3.

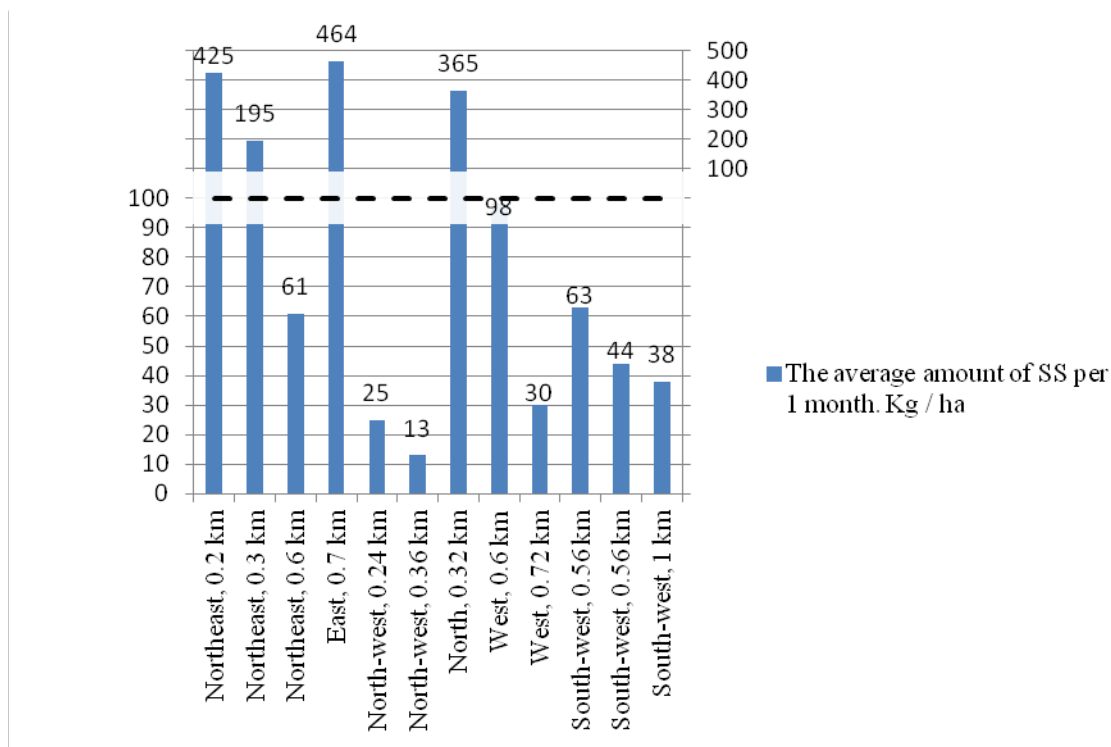


Figure 1. The amount of SS in the snow cover in the Zavodskaya (Plant) Zona

From Figures 1, 2, 3 it can be seen that the maximum concentration of SS is recorded in the northern, northeastern and eastern regions of the Plant Zone at a distance of 0.2 to 0.7 km from the plant's pipe. The amount of SS here exceeds the benchmarks by 58-385 times [5]. The predominance of pollution in these areas can be explained by the peculiarities of the wind regime on the territory of the village: winds of the western and south-western directions prevail. In addition, a high percentage of days with calm contribute to the contamination of the territory around the enterprise.

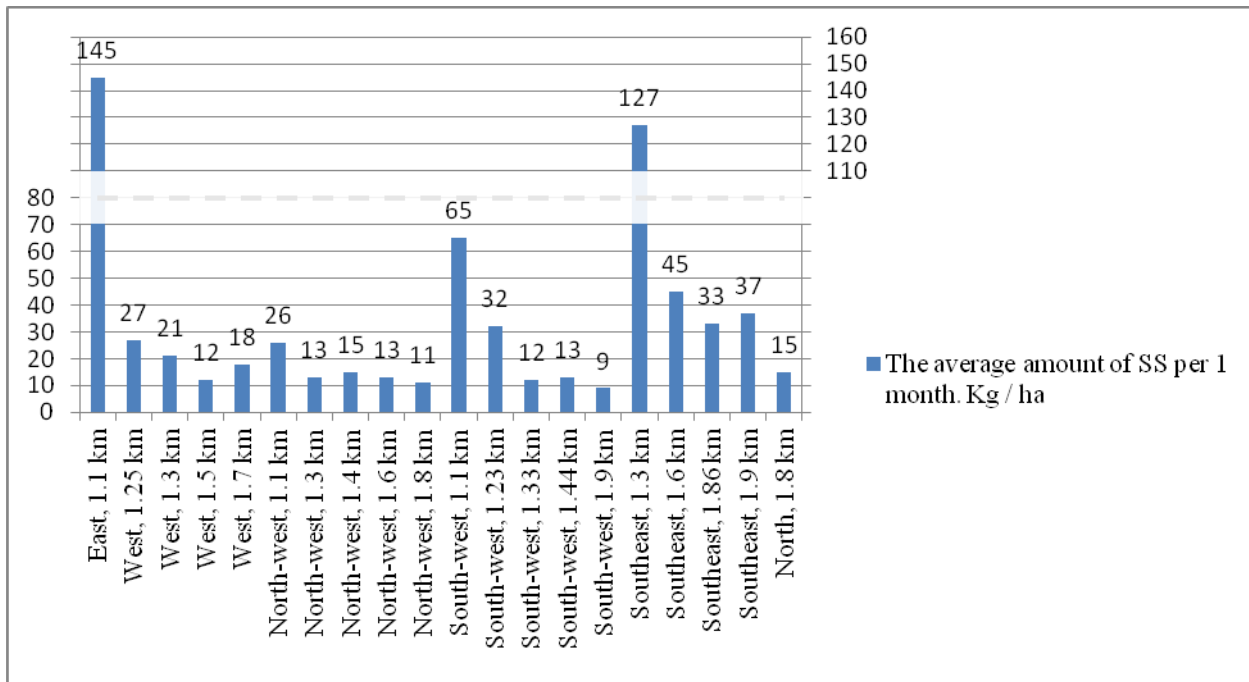


Figure 2. The amount of SS in the snow cover in the residential development area

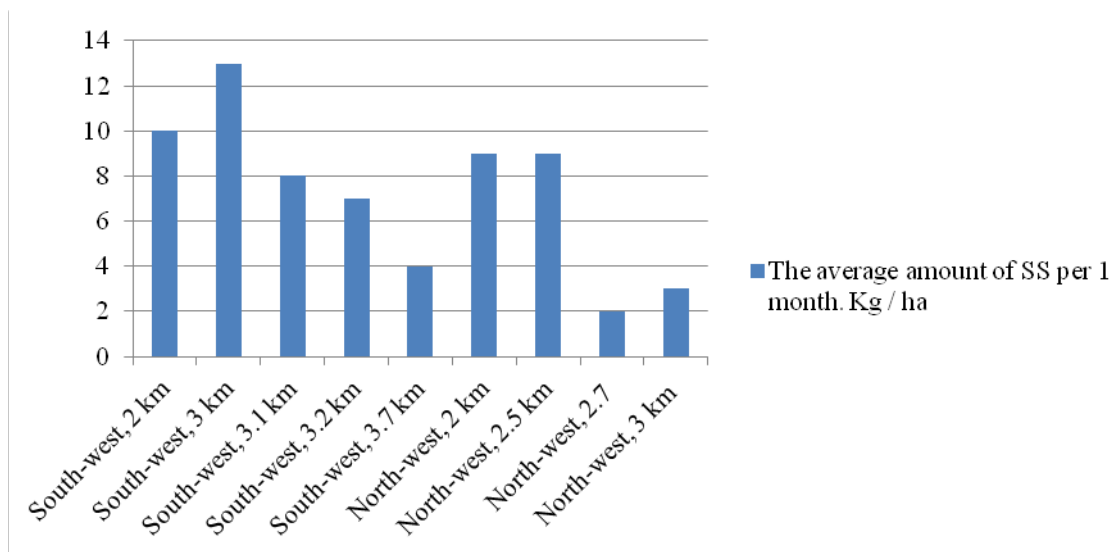


Fig. 3. The amount of SS in the snow cover in the territory of the homestead lands

As the distance from the plant decreases, the amount of SS in the snow cover in the zone of residential development decreases in all directions. The maximum concentration is noted at a distance of 1.1 km from the plant's pipe in an easterly direction (145 kg / ha) and 1.3 km in the southeast direction (127 kg / ha). The most favorable situation is in the zone of homestead plots, at a distance of more than 3 km from the factory pipe: the amount of SS ranges from 3 to 13 mg / kg [5].



The average amount of SS in the snow cover for 1 month (kg / ha) on the territory of the surveyed zones and the excess of the control indicator are reflected in Fig. 4.

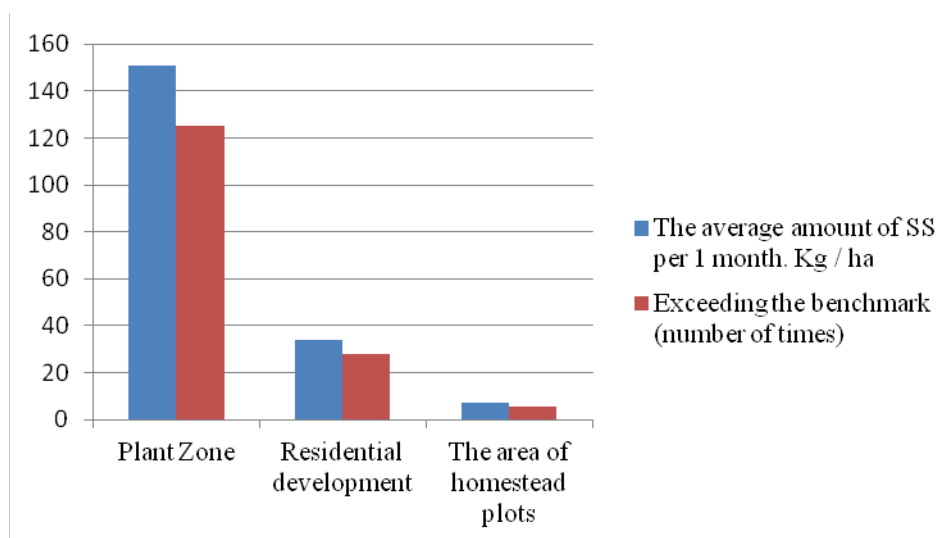


Fig. 4. Average amount of SS in the territory of the village of Teploe ozero

In Fig. 4 it can be seen that in the Plant Zone (up to 1 km from the source of pollution), the average value of deposition of SS was 151 kg / ha per month, which exceeds the benchmark by 125 times. In the zone of residential development, the average amount of SS in the snow cover, in comparison with the Plant Zone, decreases 4.5 times, although it remains very high at 34 kg / ha per month (there is a 28-fold increase in the benchmark). On the territory of two to four kilometers (in the area of homestead plots), the average amount of SS is 7 kg / ha per month, which exceeds the benchmark rate by 6 times. The analysis of the obtained data indicates a high level of dustiness in the atmospheric air in the village of Teploe ozero.

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Аннотация.

В статье анализируется содержание взвешенных веществ в снежном покрове на территориях, находящихся на разном расстоянии от Теплоозерского цементного завода, которое определялось методом снеговой съемки в конце зимы, когда концентрация загрязняющих веществ в снеге достигала максимальных значений. Точки опробования располагались преимущественно на территории поселка и вокруг предполагаемой зоны максимального загрязнения. Показано, что завод загрязняет прилегающие территории на расстоянии более чем 3 км от его основной трубы, при этом максимальный уровень загрязнения отмечается в километровой зоне и зависит от ветрового режима. Анализ полученных данных свидетельствует о высоком уровне запыленности атмосферного воздуха п. Теплое озеро.

Ключевые слова: атмосферный воздух, взвешенные вещества, снеговая съемка, цементный завод, загрязнение атмосферы.

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Article sent: 28/03/2017 of

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j12-059

DOI: 10.21893/2227-6920.2017-12.059

УДК: 582

**THE RARE COMPONENT OF THE FLORA OF NORTH-EASTERN
REGION OF UKRAINE**

**РАРИТЕТНА КОМПОНЕНТА ФЛОРИ ПІВНІЧНО-СХІДНОГО
РЕГІОНУ УКРАЇНИ**

Koval L.V., Horshkova L.M. / Коваль Л.В., Горшкова Л.М.

*Oleksandr Dovzhenko Hlukhiv national pedagogical university
Hlukhiv, Kiev-Moskovska, 24, 41400*

*Глухівський національний педагогічний університет імені Олександра Довженка
Глухів, Києво-Московська, 24, 41400*

Abstract. The results of inventorization and complex floristic analysis of rare plant species of the north-eastern region of Ukraine are presented in the article. The total number of rare species vascular plant of north-eastern region of Ukraine includes 97 species belonging to 36 families, 67 genera. Among them are 11 species that included in the list of Convention on the Conservation of European Wildlife and Natural Habitats (Bern,1979), 32 species are listed on the Red Date Book of Ukraine.

Key words: rare species, vascular plants, north-eastern region, Red Date Book of Ukraine.

Анотація. У статті представлені результати комплексного флористичного аналізу раритетної компоненти флори північно-східного регіону України. Загальна кількість рідкісних видів судинних рослин у межах північно-східного регіону складає 97 видів, що відносяться до 36 родин, 67 родів. Серед них 11 видів включені до Списку конвенції про збереження дикої природи та природних середовищ існування в Європі (Берн, 1979), 32 види занесені до Червоної книги України.

Ключові слова: рідкісні види, судинні рослини, північно-східний регіон, Червона книга України

Introduction. In our time the complication of economic and ecological



situations in Ukraine assists increase of synantropization of vegetable cover, impoverishment of natural flora. Therefore regional researches of rare species of plants of natural flora are actual [3].

The north-eastern region of Ukraine is located on the boundary of geological, geomorphological structures of the earth's crust, and also within the limits of forest and forest-steppe physic-geographic zones. It predetermines an increase here in the conditions of ecotone of many frontier species of vascular plants. The many of them need of defense.

Research territory is located within N51° 21'-51° 59' (North latitude), E 33°10'-34°15' (East longitude) and includes Yampil, Shostka, Seredino-Buda, Hlukhiv, Krolevets, Putyvl districts of Sumy region and Novhorod-Siversk district of Chernigiv region.

According to T. L. Andrienko (1977) the studied territory is within the limits of Novgorod-Siversk-Ponornick, Shostka, Krolevets-Hlukhiv geobotanical districts [1]. The climate of the region is temperate-continental with average temperatures +18,5°C in July and -7,5 °C in January. Precipitation is 625 mm/year. The soils are mainly gray and dark gray forest, sod-podzolic under broadleaf oak-maple-linden forests; sandy soils under pineries forests. Under the influence of high erosion chalk outcrop can be seen. The research territory is drained by the rivers Desna, Seim and by tributaries.

The **aim of the study** is to conduct the taxonomic, biomorphological, ecological, geographical analysis of flora of rare species of vascular plants of north-eastern region of Ukraine.

Material and methods. Floristic research were executed with the field research method during 2004-2015 period and the complex of accepted methods of floristry [7]. The list of flora of rare species of vascular plants includes all rare species spontaneously growing in a region. Part of species is from literary data [2,6]. Ecological and ecocenotic groups are given according to the "Ecoflora of Ukraine" by Ya. P. Didukh (2000) [4]. The geographic analysis is based on the chorological areas which were distinguished A. L. Takhtadzhyan, H. Meusel [5,8].



Results. According to our studying the total number of vascular plant species, threatened with destruction as a result of the human activity impact in the north-eastern region, includes 97 species belonging to 36 families, 67 genera.

The leading families according to species richness are *Orchidaceae* 18 (19%) species, *Asteraceae* – 9 (10%), *Ranunculaceae* – 8 (9%), *Iridaceae* – 5 (5%), *Aspidiaceae* 4 – (4%), *Lycopodiaceae* – 4 (4%), *Cyperaceae* – 4 (4%), *Liliaceae* – 4 (4%), that together make 62 (63,9 %) of species.

Table. 1

The spectrum of leading families and genera of rare plants of north-eastern region of Ukraine

Families	Species	%	Genera	Species	%
<i>Orchidaceae</i>	18	18,5	<i>Orchis</i>	4	4,1
<i>Asteraceae</i>	9	9,3	<i>Carex</i>	4	4,1
<i>Ranunculaceae</i>	8	8,3	<i>Dryopteris</i>	3	3,1
<i>Iridaceae</i>	5	5,2	<i>Salix</i>	3	3,1
<i>Liliaceae</i>	4	4,1	<i>Jurinea</i>	3	3,1
<i>Cyperaceae</i>	4	4,1	<i>Iris</i>	3	3,1
<i>Lycopodiaceae</i>	4	4,1	<i>Dactylorhiza</i>	3	3,1
<i>Aspidiaceae</i>	4	4,1	<i>Lycopodium</i>	2	2,1
<i>Salicaceae</i>	3	3,1	<i>Epipactis</i>	2	2,1
<i>Caryophyllaceae</i>	3	3,1	<i>Platanthera</i>	2	2,1
Total	62	63,9	Total	29	30

The leading genera according to species richness are: *Orchis* 4 (5%), *Carex* 4 (5%), *Dryopteris* 3 (4%), *Salix* 3 (3%), *Jurinea* 3 (3%), *Iris* 3 (3%), *Dactylorhiza* 3 (3%), that together make 29 (30 %) of species.

The composition of leading families specifies that the flora of rare species is close to floras of boreal-temperate zone of Holarctic (high rank of *Asteraceae*, *Ranunculaceae*, *Cyperaceae*, *Salicaceae*) and to floras of Mediterranean (high rank of *Lamiaceae*, *Liliaceae*).



In the spectrum of the biomorphological structure in studied flora the most of plants is herbaceous polycarps – 89 (91,7%). Monocarps and biennial monocarps – 2 (2,06 %). Other forms are: trees – 1 (1,03%), shrubs – 5(5,1%).

Among the native conditions for the vegetation the factor of the humidity plays a considerable role. According to our research the ecological spectrum of humidity of species studied flora is divided into 4 groups. The first place is occupied by mesophytes 49 (50%). Other groups consist of: hygrophytes 22 (23%), hydrophytes 6 (6%), xerophytes 20 (21%).

The rare species on the studied territory are distributed among 5 ecocenotic groups such as: forest and forest margins – 51 (53%) species, meadow – 8 (8%), bog – 13 (13%), litoral-aquatic –7 (7%), meadow-steppe –18 (19%).

Among species that decreased the quantity in populations prevail the herbaceous polycarps of open meadow and forest margins territories of the moderate and middle moistening: *Hesperis sibirica* L., *Campanula persicifolia* L., *Succisa pratensis* Moenh., *Scabiosa ochroleuca* L., *Knautia arvensis* (L.) Coult., *Anthyllis vulneraria* L., *Astragalus glycyphyllos* L., *Coronilla varia* L., *Trifolium alpestre* L., *Trifolium montanum* L., *Scutellaria galericulata* L., *Briza media* L., *Potentilla erecta* (L.) Raeusch., *Naumburgia thyrsoiflora* L.

The distribution of rare species of north-eastern region of Ukraine according to ecological groups and coenotical complexes are fairly typical for Holarctic floras. However favorable hydrological conditions associated with the closed sediments of Chalk and thus groundwater, Cretaceous outcrop in the relief structure gives terrain specific features to the rare flora of the region.

The geographical spectrum of species areas of studied flora is divided into 6 types including 30 groups. The species with Palearctic 48 (49,4%) and European – 20 (20,6%) types are dominated. Other types make up: Holarctic – 11 (11,3 %), European-ancient Mediterranean – 8 (8,2%), pluri-regional – 7 (7,2%), cosmopolites – 2 (2,06%)

Generally the flora of rare species of north-eastern region has paleoarctic character with the significant share of european and mediterranean elements.



Among frontier species 14 are on the extreme north boundary of the natural habitat, for example: *Dianthus andrzejowskianus* (Zapal.) Kulcz., *Gypsophilla paniculata* L., *Cerasus fruticosa* (Pall.) Woron., *Linum flavum* L., *Trinia multicaulis* Schishk, *Aster amellus* L..

7 species are on the extreme south limit of distribution: *Diphasiastrum complanatum* L., *Pedicularis sceptrum-carolinum* L., *Parnassia palustris* L. та ін.; 4 species – on the eastern limit: *Anemone nemorosa* L., *Galanthus nivalis* L., *Gladiolus imbricatus* L.

Among the rare species vascular plants of north-eastern region are 11 species that included in the list of Convention on the Conservation of European Wildlife and Natural Habitats (Bern,1979) such as: *Botrychium multifidum* S.G.Gmel., *Pulsatilla patens* (L.) Mill., *Salvinia natans* (L.) All, *Ostericum palustre* (Bess.) Bess., *Dracocephalum ruyschiana* L., *Gladiolus imbricatus* L., *Gladiolus tenuis* Bieb., *Neottianta cuculata* (L.) Schlechter; 3 species on the Appendix of Convention CITES: *Adonis vernalis* L., *Cypripedium calceolus* L., *Orchis militaris* L.

32 species are listed on the Red Book of Ukraine: *Lycopodium annotinum* L., *Diphasiastrum complanatum* L., *Diphasiastrum zeilleri* (Rouy). Holub, *Hyperzia selago* (L.) Bernh.ex Schrank, *Pulsatilla pratensis* (L.) Mill., *Betula humilis* Schrank., *Salix starkeana* Willd., *Salix myrtilloides* L., *Trapa natans* L. s.l., *Nymphoides peltata* S. G. Gmel., *Pedicularis sceptrum-carolinum* L., *Bulbocodium versicolor* (Ker. Gawl.) Spreng., *Lilium martagon* L., *Allium ursinum* L., *Galanthus nivalis* L., *Cephalanthera longifolia* (L.) Fritsch, *Listera ovata* L., *Dactylorhiza maculata* L., *D. fuchsii* (Druce) Soo', *D. incarnata* (L.) Soo', *Goodyera repens* L., *Epipactis atrorubens* (Hoffm. ex Benh.) Schult., *E. helleborine* (L.) Crantz, *Malaxis monophyllos* (L.) Sw., *Neottia nidus-avis* (L.) Rich, *Orchis laxiflora* Lam., *O. palustris*, *O. morio* L., *Platanthera bifolia* (L.) Rich, *P. chlorantha* (Cust.) Rchnb., *Stipa pennata* L., *S. tirsia* Steven. and other [6].

49 species are listed on the Red Book of Sumy and Chernigiv regions: *Lycopodium clavatum* L., *Dryopteris dilatata* (Hoffm.) A. Gray, *D. carthusiana* (Vill.) H.P.Fuchs, *D. cristata* (L.) Gray, *Gymnocarpium dryopteris* (L.) Newn.,



Matteuccia struthiopteris (L.) Tod., *Juniperus communis* L., *Nymphaea alba* L., *N. candida* J. et C. Presl, *Adonis vernalis* L., *Aquilegia vulgaris* L., *Anemone nemorosa* L., *A. sylvestris* L., *Clematis recta* L., *Eremogone saxatilis* (L.) Ikonn., *Gypsophilla paniculata* L., *Viola epipsila* Ledeb., *Helianthemum nummularium* (L.) Mill., *Dentaria quinquefolia* Bieb., *Salix myrsinifolia* Salisb., *Parnassia palustris* L., *Drosera rotundifolia* L., *Cerasus fruticosa* (Pall.) Woron., *Linum flavum* L., *L. perenne* L., *Trinia multicaulis* Schishk., *Valeriana rossica* P. Smirn., *Digitalis grandiflora* Mill., *Pedicularis kaufmannii* Pinzg., *Prunella grandiflora* (L.) Scholl., *Campanula cervicaria* L., *Aster amellus* L., *Centaurea ruthenica* Lam., *C. sumensis* Kalen., *Galatella linosyris* (L.) Rchb. f., *Inula ensifolia* L., *Jurinea arachnoidea* Bunge, *J. calcarea* Klok., *J. charcoviensis* Klok., *Iris hungarica* Waldst. et Kit., *I. pineticola* Klok., *I. sibirica* L., *Carex brizoides* L., *C. limosa* L., *C. rhizina* Blytt ex Lindb., *C. umbrosa* Host., *Scolochloa festucacea* (Willd.) Link, *Calla palustris* L. and other [2].

Conclusions

1. Inventorization and complex analysis of rare plant species of the north-eastern region of Ukraine was produced.
2. The total number of rare species vascular plant of north-eastern region of Ukraine includes 97 species belonging to 36 families, 67 genera.
3. The taxonomic, biomorphological, ecological and ecocenotic analysis of the flora of rare species proves that it is typical of the Holarctic floras but it has some features of the Forest and Forest-steppe zones (Novgorod-Siverske Polissya and Sumy Lisostep)
4. The results of geographical analysis testify about closer relations of the studied flora to the floras of the ancient Mediterranean.
5. On the whole zoological analysis proves the necessity of expanding of the regional list rare vascular plants species within the region territory, as well as increasing the space of protected areas.

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GEOGRAPHY

j12-034

DOI: 10.21893/2227-6920.2017-12.034

СМЕРЧИ НАД УКРАИНОЙ В 2001-2016

TORNADOES OVER UKRAINE IN 2001-2016

с.геогр.с., аs.prof. Semergei-Chumachenko A.B. / к.геогр.н., доц. Семергей-Чумаченко А.Б.

ORCID: 0000-0001-8718-4073

МА Krolenko Y.I. / магістр Кроленко Ю.І.

*The Odessa State Environmental University, Odessa, Lvovskaya 15, 65016**Одесский государственный экологический университет, Одесса, ул. Львовская 15, 65016*

Abstract. In this paper defined the Modern geographical distribution of tornadoes over Ukraine in 2001-2016 2016 years. Estimated the daily and annual progress of the phenomenon's emergence. Obtained the distribution of tornadoes according to the F-scale for different regions of Ukraine.

Key words: tornado, atmospheric vortex, geographic factor, F-Scale

Introduction. Tornado – a mesoscale vortex (meso- γ), which rotates very tall and has a narrow column of air with a diameter of about 100 meters, which extends from cumulonimbus clouds to the ground. These vortices are formed in the presence of strong and steady upward movement in cumulonimbus clouds and usually occurs in cold front with waves in the presence of cyclonic circulation meso-scale β in the lower troposphere with significant instability of the atmosphere.

Tornado causes huge catastrophic destruction due to a rather large force of wind pressure and large pressure difference between it and the environment

Tornado in Ukraine belongs to the most dangerous natural atmospheric phenomena. The degree of knowledge of its physical mechanism, the formation and prediction (prognostic guidelines) limited.

Results. Using interactive database of European Severe Storms Laboratory ESSL [1] detected 247 the occurrence of tornadoes (fig. 1) over Ukraine from 2001 to 2016.

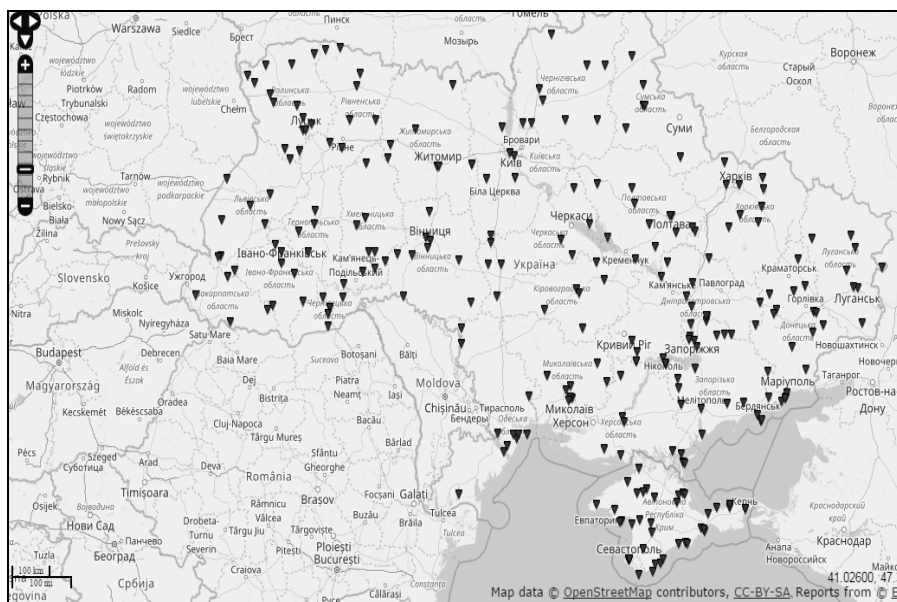


Figure.1. Map of the distribution tornadoes over Ukraine (2001-2016)

As can be seen from the graph (fig. 2) in the period 2001-2016 the number of tornadoes over Ukraine ranged from 8 to 25 cases per year, ie an average of 15.4. Most tornadoes (25 cases) were observed in 2006 and 2015, and only 7 vortices appeared in 2008 and 2009.

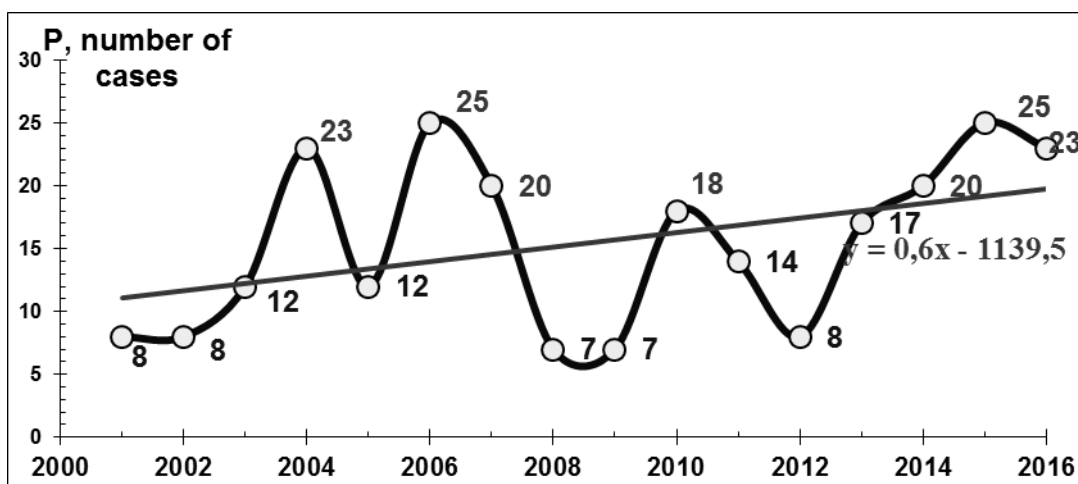


Figure.2. The frequency of tornadoes (P, number of cases) over Ukraine in 2001-2016.

Analysis of interannual variability of the frequency of tornadoes led to the conclusion of the increasing number of tornadoes from 2001 to 2016, but it is difficult to distinguish the contribution of natural and social factors. That is, its share of the increase in the number of registered tornadoes making rapid development in



recent years, social networks and opportunities present in the population quality photographs of events and instant distribution of images.

As shown in fig. 3, for the period 2001-2016 years tornadoes formed mainly from May to August (89%), and the warm half of the year accounted for 96%. That is, there were 11 tornadoes in the cold season, so without the contribution of thermal convection, including 9 cases occurred in March and one in January 2011 and October 2002.

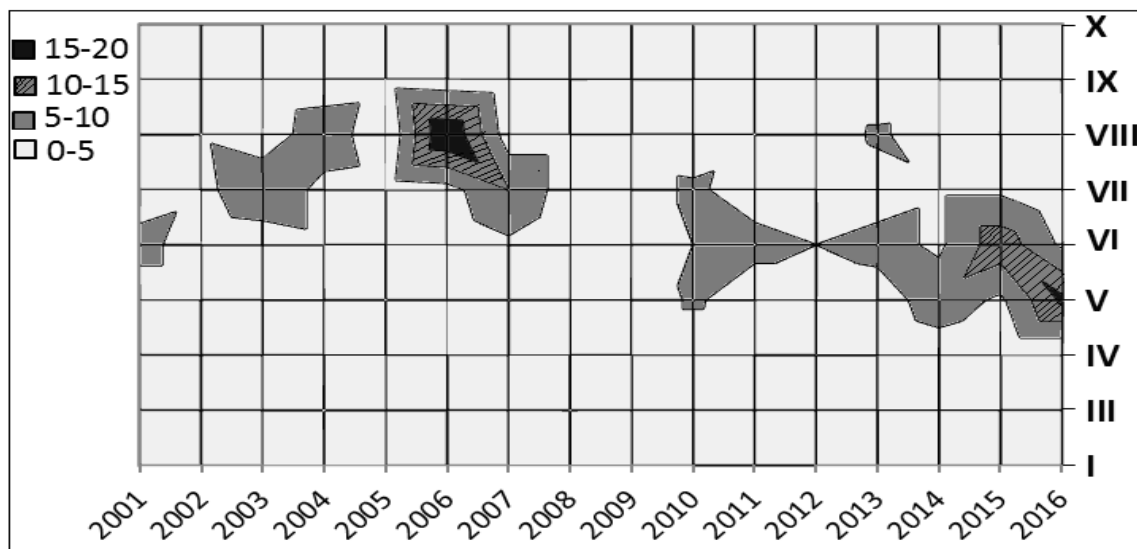


Figure.3. Seasonal distribution of tornadoes over Ukraine (2001-2016)

Depending on the region has changed markedly seasonal course of tornado formation (Fig. 4), namely in northern and southern regions of relatively less active tornadoes formed in July (12 and 17%). In the west and in the center there was relatively similar seasonal distribution, while from May to August frequency of tornadoes was approximately 20%.

Eastern regions differed advantage available July vortices (38%) and their sudden decrease in August (3%) and a significant share in March. May reduce the number of tornadoes in August and September (only one case) due to insufficient collateral moist eastern regions.

Research period characterized by predominant formation of tornadoes from 12 to 18 hours (58%), but this share decreased by 11% compared with the [2] is reduced contribution of thermal convection in the processes of tornadoes.



If we consider the distribution of tornadoes in appearance depending on time of day and season, the highest number of vortices was recorded during the day (12-18 UTC) from May to July, which were not significantly different from [2-4]. Interestingly, in September, repeatability morning and afternoon tornadoes same (47% or 7 cases), possibly due to their relatively small numbers.

The influence of geography on daily progress can be seen in the warmest region is in southern Ukraine, where the proportion of the morning and afternoon tornadoes are virtually identical.

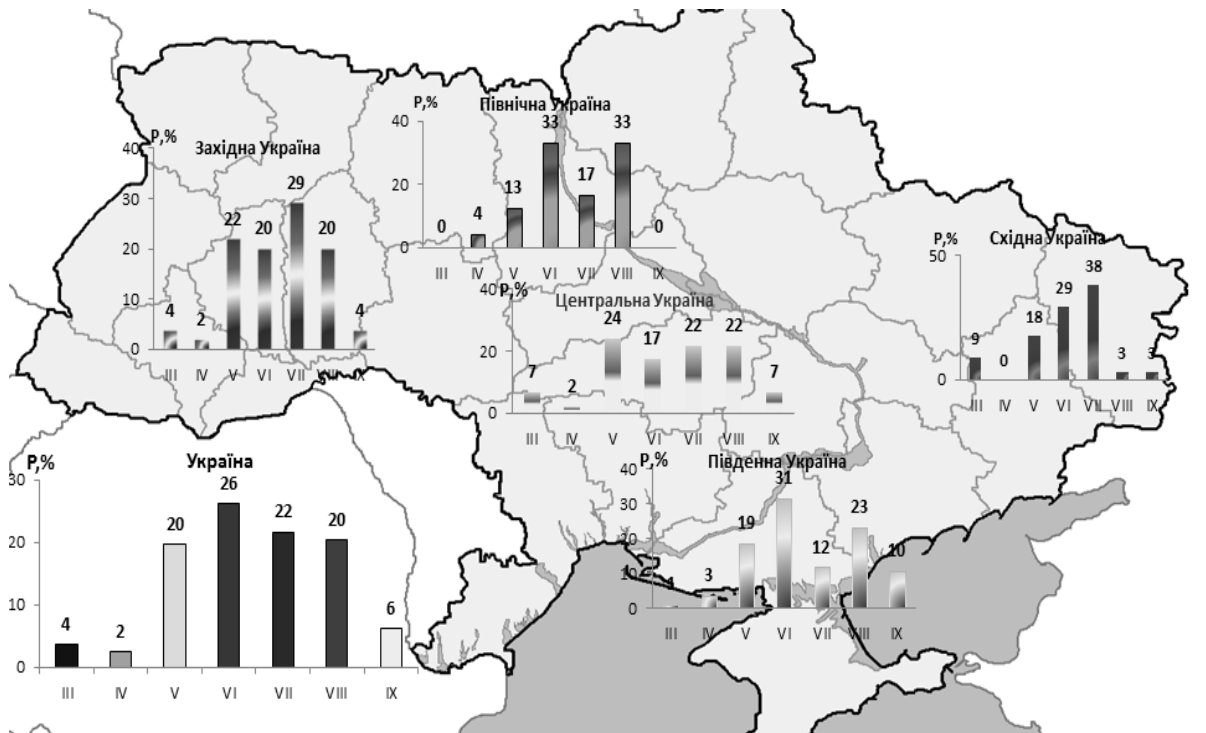


Figure.4. Regional features seasonal formation of tornadoes Ukraine

As for the intensity of tornadoes on a scale Fujita, then over Ukraine from 2001 to 2016 was dominated by weak vortex (66%), that class F0 (Table 1). Strong tornadoes or class F3 recorded only 6 times, and half of them are there in the north. In eastern Ukraine and in the center there were no strong tornadoes.

F0 largest share class was typical for the southern regions (83%) and lowest for the northern (48%). Tornadoes with moderate intensity (F1) formed mainly in eastern Ukraine, and significant (F2) - in the west.

**Table 1**

The intensity (F-scale) of tornadoes in regions of Ukraine

Regions	Intensity (F-scale)							
	F0		F1		F2		F3	
	number	%	number	%	number	%	number	%
North Ukraine	12	48	5	20	5	20	3	12
South Ukraine	72	83	8	9	6	7	1	1
Eastern Ukraine	19	56	14	41	1	3	0	0
Western Ukraine	31	56	10	18	12	22	2	4
Central Ukraine	30	65	9	20	7	15	0	0
Ukraine	164	66	46	19	31	13	6	2

By authors

Summary and Conclusions.

1. Comparing modern period and the years 1961-1990. [2] found that in recent years the annual inherent smoother progress by increasing the proportion of May and August.

2. The whole territory of Ukraine from 2001 to 2016 suffered from tornadoes, but more often they occurred in the south (35%), least of all in the North (10%) of the country. Depending on the region has changed markedly seasonal course of tornado formation.

3. Over Ukraine prevailed (66%) weak vortex (class F0), and strong tornadoes (class F3) recorded only 6 times, and half of them are there in the north. The largest share of class F0 was typical for the southern regions (83%)

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ISSN: 1562-0808

URI: <http://dspace.nbuiv.gov.ua/handle/123456789/10699>

Аннотация.

В этой работе определено современное географическое распределение торнадо над Украиной в 2001-2016 гг. Оценено суточный и годовой ход возникновения этого явления. Получено распределение торнадо согласно F-шкале для разных регионов Украины.

Ключевые слова (на рус.яз.): смерч, атмосферный вихрь, географический фактор, Ф-шкала.

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ISSN: 1562-0808

URI: <http://dspace.nbuiv.gov.ua/handle/123456789/10699>

This article was prepared within the framework of the Research topics
“The forecasting of severe meteorological phenomenon over Southern Ukraine”
State Registration # 0115U006532

Article sent: 30/03/2017 of

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j12-057

DOI: 10.21893/2227-6920.2017-12.057

ИЗМЕНЕНИЕ СКОРОСТИ ВЕТРА НАД ОДЕССКОЙ ОБЛАСТЬЮ

CHANGE IN WIND SPEED OVER THE ODESSA REGION

с.geogr.s., prof. Ivus G.P. / к.географ.н., проф. Ивус Г.П.

ORCID: 0000-0003-4118-6887

с.geogr.s., as.prof. Semergei-Chumachenko A.B. / к.географ.н., доц. Семергей-Чумаченко А.Б.

ORCID: 0000-0001-8718-4073

МА Ророва Л.О. / магистр Попова Л.О.

phd student Kovalvov I.A. / аспирант Ковальков И.А.

*The Odessa State Environmental University, Odessa, Lvovskaya 15, 65016**Одесский государственный экологический университет, Одесса, ул. Львовская 15, 65016*

In this paper defined the modern change in wind speed over the Odessa region. The features of the space-time distribution of wind speeds are considered. Calculation and analysis of average monthly wind speeds revealed a decrease in wind speed over most of the Odessa region.

Key words: wind speed, prevailing wind

Introduction. The wind regime is an important climatic characteristic of the territory, and the wind speed is one of the meteorological variables that have a significant impact on the lives and human activity. Wind substantially directly affect the performance of various sectors of the economy such as energy, telecommunications, agriculture, transportation (aviation, road and rail transport as well as sea and river transport) suffer large losses due to underestimation of the wind, especially strong [1].

Initial data - meteorological observations at meteorological stations Odessa-HMO, Dunayska HMO (Izmail) and Liubashivka (2005-2015), Bilhorod-Dnistrovskiyi and Rozdilna (2006-2014) in the form of an interactive database [5].

Results. Over the last 30 years, there has been a gradual weakening of the wind over the southwest of Ukraine, and a large part of the Odessa region was no exception. So, for example, the wind speed in Izmail decreased in 2005-2015 in comparison with 1961-1990, it is 0,5 m/s [6], from 3,6 to 3,1 m/s (Table 1). Only



over Bilhorod-Dnistrovskiyi was the reverse trend, when the average annual speed increased by 0,6 m/s from 4,0 to 4,7 m/s. The station with the least intensive wind regime turned out to be Rozdilna, with the average annual speed in 2005-2015 2,2 m/s and at this point there was a significant weakening of the wind (0,8 m/s).

Table 1

Average wind speed over Odessa Region for 1961-1990 [4] 2005-2015

Period	Months												Year
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	
Odessa HMO													
1961-1990	4,6	4,6	4,3	3,8	3,4	3,2	3,2	3,3	3,4	3,9	4,3	4,3	3,9
2005-2015	3,9	3,5	3,2	2,8	2,4	2,3	2,5	2,3	2,6	3,0	3,1	3,5	2,9
Rozdilna													
1961-1990	3,3	3,5	3,4	3,3	3,1	2,7	2,6	2,7	2,6	2,7	3,0	3,0	3,0
2006-2014	2,5	2,4	2,5	2,3	2,0	2,1	2,1	2,0	2,1	2,3	2,3	2,4	2,3
Bilhorod-Dnistrovskiyi													
1961-1990	4,0	4,4	4,0	4,2	3,8	3,8	3,9	3,7	3,7	3,9	4,1	4,1	4,0
2006-2014	4,9	4,9	5,2	4,7	4,3	4,4	4,5	4,5	4,3	4,8	4,5	5,1	4,7
Izmail													
1961-1990	4,0	4,4	4,3	4,3	3,8	3,5	3,2	2,9	2,9	3,0	3,3	3,6	3,6
2005-2015	3,2	3,3	3,7	3,2	3,0	3,0	2,9	2,8	3,1	3,0	2,7	3,0	3,1
Liubashivka													
1961-1990	4,1	4,3	4,1	4,0	3,4	3,0	2,9	2,9	2,9	3,2	3,7	3,9	3,5
2005-2015	3,5	3,0	3,6	3,3	2,6	2,5	2,4	2,4	2,5	2,6	2,8	3,3	2,9

As well as over the entire territory of Ukraine, over the Odessa region can be traced a clear annual wind speed - up to the largest values it grows in January-February, and the minimum reaches in August. The maximum wind speed at Odessa-HMO (18 m/s) observed in March 2007. At Izmail, the value of the maximum wind speed for 2005-2015 was 21 m/s (July 2015), at Liubashivka - 16 m/s in March 2013.

At the Rozdilna station the maximum average wind speed during 1961-1990 was observed in May and equaled 4,6 m/s, and in 2005-2015 it fell to 3,3 m/s in



April. At the station Bilhorod-Dnistrovskiyi in 2005-2015 in comparison with 1961-1990 in contrast to the whole Odessa region, wind speed increased, and the maximum average speed reached 6,8 m/s in February 2010.

Comparison of monthly mean wind speeds over Odessa for 1961-1990 and 2005-2015 found that the average wind speed decreased by 1,0 m/s, that is, in the last 15 years observed weakening of the wind speed. Similar changes in the distribution of mean monthly wind velocities were also observed at Izmail, Liubashivka and Rozdilna. On average, for the year at Izmail wind speeds decreased by 0,5 m/s, at Liubashivka - by 0,6 m/s, at Rozdilna – 0,7 m/s (Fig. 1).

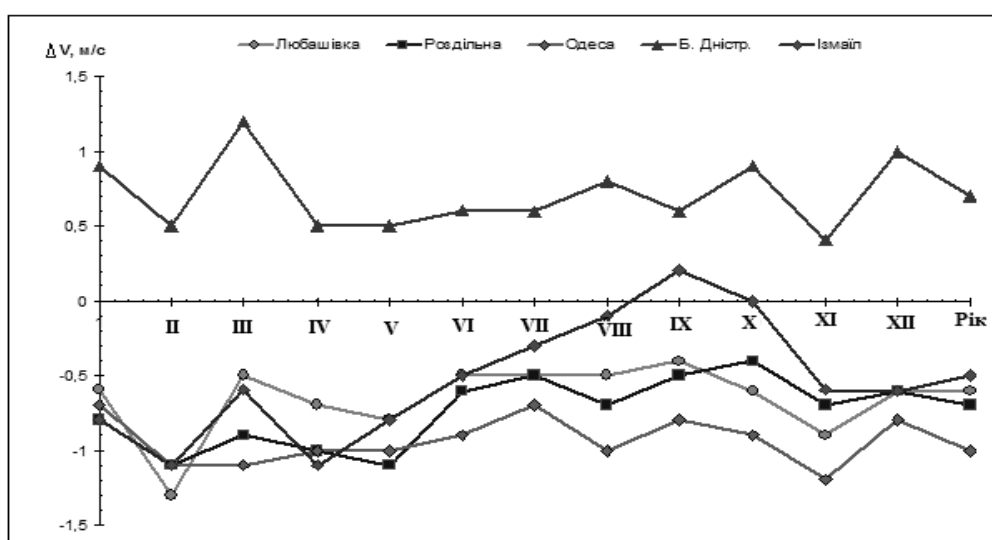


Figure.1. The change of average wind speeds from 1961-1990 [4] to 2005-2015 over Odessa region

At Izmail, in comparison with the data of wind speeds at Odessa, the wind speed decrease for the last 10 years did not happen so evenly. In August and October, the average monthly wind speed remained almost unchanged, and in September the values of average wind speeds for 2005-2015 exceeded the values for 1961-1990 [4]. At Bilhorod-Dnistrovskiyi, wind intensification was more pronounced in March and December - 1,2 and 1,0 m/s. Less intensification occurred in November (0,4 m/s).

If we plot the geographic distribution of the average monthly wind speed for January and July over the Odessa region for both periods of the study (see Figure 2), we can see the distribution of the share of less intense wind, except for the Bilhorod-



Dnistrovskiyi area. Over the last 16 years there has been a decrease in wind speed over the Odessa region except Bilhorod-Dnistrovskiyi.

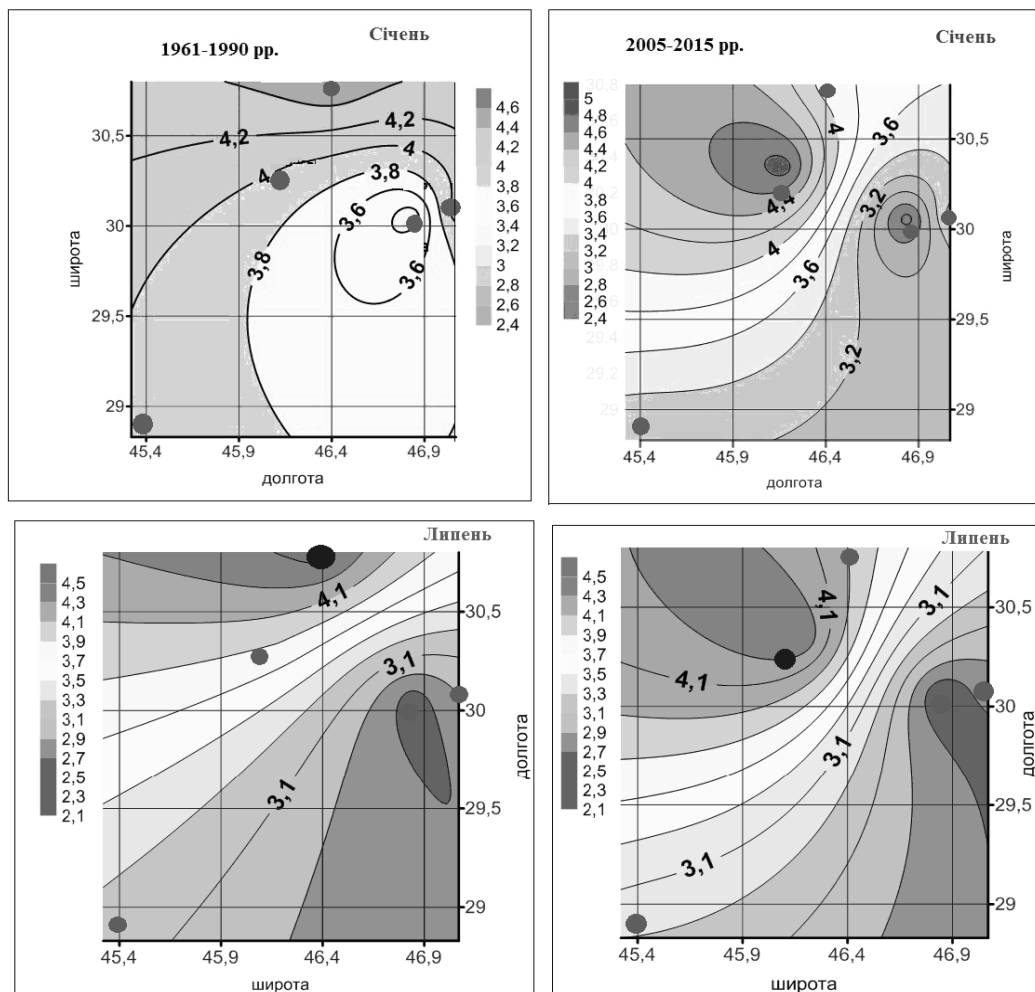


Figure.2. Distribution of average wind speeds of Odessa region in January and July for the periods 1961-1990 and 2005-2015 years

Summary and Conclusions. At the stations Odessa, Liubashivka and Rozdilna in 2005-2015 was observed a decrease in the average monthly values of wind speeds relative to 1961-1990, and most of all the wind weakened in February.

Over the Odessa region there was a clear annual wind speed with a maximum in January-February and a weakening of its intensity over the whole region was revealed, with the exception of the Danube HMO in September and Bilhorod-Dnistrovskiyi throughout the year, so this weakening manifests in the cold half year.

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Аннотация

В работе определяется современное изменение скорости ветра над Одесским регионом. Рассмотрены особенности пространственно-временного распределения скоростей ветра. Выявлено ослабление ветра за последние 30 лет над Одесской областью.

Ключевые слова: скорость ветра, господствующий ветер

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This article was prepared within the framework of the Research topics
“The development and improvement of methods for forecast of air pollution
meteorology over the industrial area of Odessa”

State Registration # 0113U007881

Article sent: 03/04/2017 of

© **Ivus G.P., Semergei-Chumachenko A.B., Popova L.O., Kovalkov I.A.**

**MEDICINE, VETERINARY AND PHARMACY****j12-052****DOI: 10.21893/2227-6920.2017-12.052****OSTEODYSTROPHY DURING: SPECIFICS OF IT AND SYMPTOMS IN
COW****ОСТЕОДИСТРОФІЯ ВАГІТНИХ: ОСОБЛИВОСТІ ПЕРЕБІГУ ТА
ПРОЯВУ У КОРІВ****Koreyba L.V., Candidate of Vet. Sc., Associate Professor, / Корейба Л.В., к.вет.н., доцент,****Suslova N.I., Candidate of Vet. Sc., Associate Professor / Суслова Н.І., к.вет.н., доцент,****Makeyeva N.S., postgraduate / Макєєва Н.С., аспірант,****Golub A.A., master. / Голуб А.А., магістр****Dnipropetrovsk State Agro-Economical University****Дніпропетровський державний аграрно-економічний університет**

***Annotation:** Established that the clinical signs of puerperal osteodystrophy were not typical and manifested in cows as restriction of mobility; appetite loss and distortion; licking; hypotension of proventriculus and weakening peristalsis, cautious in movements, painfulness of skeleton and joints, especially in the ribs area and tubular bones.*

Noted a change in acidy-alkaline balance towards acidosis; reducing level of total calcium and inorganic phosphorus and also calcium-phosphorus balance shift; reduce in the concentration of glucose; increased activity of alkaline phosphatase and urea nitrogen.

***Key words:** cows, puerperal osteodystrophy “dry” period, blood plasma, biochemical indicators.*

Introduction: Osteodystrophy – is a chronic disease characterized by degenerative changes in the bone tissue due to the disturbed calcium, phosphorus and vitamin D-metabolism; damage to the nervous and muscular system, liver and other organs [1, 5].

Osteodystrophy is recorded in almost all regions of the country. Most frequently affected highly productive cows aged 3 to 7 years through pregnancy or



during 1–1.5 months after calving and has nutritional, puerperal or enzootic etiology. Puerperal osteodystrophy develops during pregnancy because calcium and phosphorus spent on fetal growth and development [3].

Literature review: Mass osteodystrophy in high performance cows causing significant losses to the farmer's economy. During illness the milk productivity is sharply reduced. Decrease in milk yield during prolonged disease in a highly productive cows reaches 80-90% of the milk yield before the disease; in cows with an average capacity 27–86,7% and in low productive cows decrease is 55,6–78,6% [5, 7].

According to many researchers subclinical course of osteodystrophy recorded more often than published in the official statistics. Such differences in data related to the imperfection of the clinical diagnosis of the disease and understanding of the molecular mechanisms of pathogenesis [1, 2, 4, 6].

Therefore very important is the study of the pathogenesis and development of diagnostic tests aimed at the preclinical diagnosis of osteodystrophy, which will provide more effective therapeutic and preventive work.

Input data and methods: The aim of our study was to explore the specifics of manifestation and course of the disease of puerperal osteodystrophy at highly productive cows.

The diagnosis was based on anamnesis, clinical signs and biochemical studies of blood plasma.

Material and methods: Research conducted in conditions of Private-Corporation "Agro-Union" in Dnepropetrovsk region on 20 cows Holstein black-motley breed, with body weight 550–600 kg, and an annual milk production of 9000–9200 kg.

Development of osteodystrophy was studied on blood biochemical indicators of 20 animals 10 days before calving; blood was taken from the jugular vein in the morning before feeding.

The content in cow's blood plasma of BUN, Index de Ritisa (AST / ALT), Units, total protein and its fractions, urea, creatinine, glucose, total calcium, inorganic



phosphorus, carotene and total lipoprotein and the activity of aspartate- (AST) and alanine aminotransferase (ALT) and alkaline phosphatase was determined by common-accepted methods and on the biochemical analyzer STATFAX 1904 PLUS at the physiology, biochemistry and chemical-toxicological analysis department of Research Centre for Biosafety and environmental control resources of agro industrial complex DSAEU.

Results. Discussion and Analysis: Clinical signs of disease in calf cows were not typical and manifested in cows as restriction of mobility; appetite loss and distortion; licking; hypotension of proventriculus and weakening peristalsis. At the end of pregnancy noticed weakness of animal, caution in movements, painfulness of skeleton and joints, especially in the ribs area and tubular bones, during these time animals are more lying down and rise up with difficulties for them.

From biochemical parameters we have observed changes in acid-base balance towards acidosis; reduce of total calcium and inorganic phosphorus and calcium-phosphorus balance shift; reduced concentration of glucose; increased activity of alkaline phosphatase and urea nitrogen.

Biochemical parameters of cow's blood plasma were researched during late pregnancy (10 days before the expected calving).

The results of biochemical studies of blood plasma of cows during the “dry” period are presented in Table 1.

Analysis of biochemical parameters of blood plasma of cows during the “dry” period showed (Table 1) that the most significant changes in relation to the norm are marked in indicators of total protein and albumin and therefore to the protein coefficient, activity of aspartate- (AST) and alanine aminotransferase (ALT) , alkaline phosphatase, glucose, total calcium, inorganic phosphorus, carotene and total lipoproteins.

The rates of total protein and albumin tend to increase ($76,6 \pm 2,22$ g / L and $42,8 \pm 1,18$ g / L, respectively) in cows 10 days before calving.

**Table 1.****The biochemical composition of cows blood plasma, $M \pm m$; $n = 20$**

Indicators	The concentration in the blood 10 days before calving	Norm
BUN, mg%	9,32±0,5	8 – 14
Glucose, mmol. / L	1,64±0,11	2,50 – 4,16
Total protein, g / l	76,6±2,22	67 – 75
Albumin, g / l	42,8±1,18	30 – 35,5
Globulin g / l	33,8±1,71	30 – 35
The protein coefficient, units	1,32±0,13	0,5-0,8
Urea, mmol /L	4,9±0,43	2,8 – 5,8
Creatinine umol/L	112,4±7,39	88 – 177
AST, mmol/L	1,4±0,19	0,11 – 0,57
ALT, mmol/L	0,5±0,03	0,12 – 0,45
Index de Ritisa (AST / ALT), Units	3,8±0,02	1,0–3,4
Alkaline phosphatase, U /L	158,7±16,70	Less than 80
Glucose, mmol/L	1,56±0,13	2,50 – 4,16
Total Calcium, mmol/L	1,54±0,04	2,43 – 3,10
Inorganic phosphorus, mmol/L	1,32±0,06	1,81 – 2,10
Ca: P, Units	1,15±0,07	1,2 – 1,6
Carotene, mcg%	101,4±13,0	375 – 965
General lipoprotein mg%	1377,46±89,8	250 – 550

Due to increase in indicators of total protein and albumin content the protein coefficient is also rises and makes $1,32 \pm 0,13$ units. Also increased the activity of AST ($1,4 \pm 0,19$ mg, / L) and the number of total lipoprotein ($1377,46 \pm 89,8$ mg%). The trend towards increasing of activity indicator for ALT, the total content of lipoproteins and albumin is typical for osteodystrophy and degenerative changes in the liver of cows.

From the obtained results (Table 1) we can see that the glucose level was also low and amounted at $1,56 \pm 0,13$ mmol / L, which is typical for the osteodystrophy. Increase in concentrations of urea ($4,9 \pm 0,43$ mmol / L), usually passes during the enhanced exchange of proteins due to the albumin fraction. Indicators of total calcium and inorganic phosphorus were also lower than normal and were $1,54 \pm 0,04$



mmol / L and $1,32 \pm 0,06$ mmol / L respectively. Calcium-phosphorus correlation herewith amounted to $1,15 \pm 0,07$ units. The lowest was the content of carotene ($101,4 \pm 13,0$ mcg%).

Decrease in concentration of carotene in blood plasma of pregnant cows is a result of inadequate absorption of it from the intestine during the metabolism disorders, and also of insufficient its receipt in the composition of feed intake.

On the background of increased concentrations in blood plasma of protein and albumin, reduced glucose level can course the development of ketosis.

Conclusion:

1. Puerperal osteodystrophy in cows is manifested by restriction of mobility; appetite loss and distortion; licking; hypotension of proventriculus and weakening peristalsis, cautious in movements, painfulness of skeleton and joints, especially in the ribs area and tubular bones.

2. During puerperal osteodystrophy acid-base balance was changed towards acidosis; reduced levels of total calcium, phosphorus and inorganic glucose; increased activity of alkaline phosphatase and urea nitrogen.

***Анотація:** Встановлено, що клінічні ознаки пуерперальної остеодистрофії були не характерними і проявлялися у корів обмеженням рухливості, збоченням та погіршенням апетиту, лизухою, гіпотонією передшлунків та послабленням перистальтики кишечника, обережністю в рухах, хворобливість кістяка і суглобів, особливо в області ребер і трубчастих кісток.*

Відзначали зміни кислотно-лужної рівноваги в бік ацидозу; зниження рівня кальцію загального та фосфору неорганічного, а також зрушення фосфорно-кальцієвого рівноваги; зниження концентрації глюкози; підвищення активності лужної фосфатази та азоту сечовини.

***Ключові слова:** корови, пуерперальна остеодистрофія, сухостійний період, плазма крові, біохімічні показники.*

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MANAGEMENT AND MARKETING

j12-004

DOI: 10.21893/2227-6920.2017-12.004

УДК 353.9+335.35

ASSESSMENT OF EFFICIENCY OF FUNCTIONING OF THE BODY
SYSTEM OF MANAGEMENT OF REGIONAL LAW ENFORCEMENT
FORCES

ОЦІНЮВАННЯ ЕФЕКТИВНОСТІ ФУНКЦІОНУВАННЯ ОРГАНУ
СИСТЕМИ УПРАВЛІННЯ РЕГІОНАЛЬНИМИ СИЛАМИ ОХОРОНИ
ПРАВОПОРЯДКУ

N. M. Orlov / Орлов М.М.

*National Academy of National guard of Ukraine,**Kharkov, ploscha Zahysnykiv Ukrainy 3, 61001**Національна академія Національної гвардії України,**Харків, пл. захисників України 3, 61001*

Abstract. The approaches to assessment of efficiency of functioning of the body system of management of regional law enforcement forces, currently is an actual problem. Relevance is related not only with the complexity of the challenges addressed by the authorities of these forces, and available human, material and time resources provided by the government and should the control system of the security forces .

Key words: efficiency, control, security forces, control system, public administration.

Entry. The problem of efficiency of functioning of bodies of the control system was engaged as foreign scientists such as Max Weber, Th. Khol. Mazur and others [2, 3], as well as domestic, such as A. Valkos, V. Borisenko. Knyazev, V. Bakumenko and others [1, 4-6]. This issue is still relevant to the body system control of the security forces (SOPr). Assessment of the effectiveness of the functioning of the organs of the control system of the Resistance is engaged in the state through the relevant authorities. Those bodies that form the organs of the oral mucous membrane,



they are funded and are responsible for their activities.

The main part. As stated in [1], public administration is the practical, organizing and regulating influence of the state on public life with the aim to streamline, save or convert, founded on its own strength. Max Weber has defined public administration as a specific activity in the exercise of governmental authority having functional and competencies specificity that distinguishes it from other types and forms of realization of state power. This explains the role of public administration in the formation of the organs of the oral mucous membrane, financing and responsibility for their activities, i.e. for their effectiveness.

In Ukraine, the state Department has received formal recognition as an activity and as a branch of science [1, p. 63-64], which is designed to engage not only with issues of management efficiency, but the efficiency of authority control systems, including control system SOPr.

The concept of the effectiveness of management largely coincides with the concept of production efficiency organizations (military and non-military, administration, staff). Management of production has its own specific economic characteristics. Other types of control have their own characteristics. As the main criterion of management efficiency is the level of efficiency of a managed object. The problem of management efficiency – an integral part of the management of oral mucous membrane, which includes consideration of:

- management capacity, i.e. the totality of all resources that are owned and used by the control system. Managerial capacity acts in the material and intellectual forms;
- cost of maintaining the officers of the governing body and management costs, which are determined by the content, organization, technology and scope of work for the implementation of the relevant management functions;
- the nature of managerial work;
- management effectiveness, i.e. the effectiveness of the actions of the people (officials) in the process of the organization, in the process of realizing the interests in achieving certain goals.

Efficiency is the performance of the system operation and management process



as the interaction of the controlled and controlling systems, i.e. integrated by the interaction of the control components. The efficiency shows the extent to which the governing body (management body of SOPr) implements the goals, achieves the planned results. Management efficiency is realized in the efficiency in certain tasks, who decide to Resist. The results of the action associated with the purpose of the organization (security forces) and the cost of functioning of the organization, including the governing body – this is the content effectiveness as a management category. This category should be assessed and the efficiency of the body system of management of regional Resistance.

As you know, *management efficiency* is one of the main indicators of the improvement of management, determined by the comparison of the results of management and resources spent on achieving them. To assess the efficiency of management by comparing the profits (degree completed) and management costs. Management effectiveness is associated with effectiveness of the developed and deployed system management and efficiency on this system.

Of fundamental importance to assess the effectiveness of the control system has a choice of a basis for comparison or determining the level of effectiveness that is accepted for regulatory. One approach for differentiation is reduced to the comparison of indicators of efficiency of the organizational structure of the standard version control systems. The reference option can be designed and engineered using all available methods and design tools of control systems. Characteristics of this option are accepted as normative. Can be used as compared with the performance indicators and performance management system selected as the standard that defines acceptable or sufficient level of organizational effectiveness.

If management activities are fully or partially solves the problem, embodied in the expected result, and provides the achievement of the optimal use of available resources, it is considered effective. In studies of the control systems considering the external and internal efficiency.

External efficiency is also called profitability and internal efficiency, showing the price you had to pay for the result (it corresponds to the amount of costs: the



result of the task execution and resource consumption). What is the outcome of the task largely exceeds the cost, the economical activities in the first phase of the management body. Often, however, the main is not how many times the result of the assignment cost and whether it is more valuable.

The most important conditions of efficiency of management, and hence effective functioning of the management body of SOPr currently are:

- the use of new information and management technologies;
- maximum automation and computerization of processes in management.

They allow you to free man (official control body Temperature) not only from hard work, but also from the routine operations and stifle his creativity, and thus to raise the efficiency of its work.

The effectiveness of the governing body. One of the main indicators of management excellence, determined by mapping the results of management and resources spent on achieving them.

On the effective functioning of the management body of the SOPr, it is possible to say under such conditions:

- management costs have been reduced and governance indicators have not changed or have even improved;
- management costs have not changed, and the quality management activities improved;
- management costs have increased, but figures have improved significantly the quality of governance.

The effective functioning of the governing body of the oral mucous membrane may be not only economic but also social, socio-economic, political, socio-psychological and the like. Research methodology this efficiency is based on the comparison of the results with the costs associated with their achievements. The expression Th. Khola [2] “the effectiveness of managerial decisions and actions depends mainly on the nature of the problems to be solved; of management situations; conditions, particularly of an organizational nature, in which the decision occurs and management actions, and less from the characteristics of the person and



the position of managerial employee”.

Conclusions. A brief consideration of the approach to assessment of efficiency of functioning of the body system of management of regional law enforcement forces showed that at the present time is an urgent problem that must be solved comprehensively with the assessment of the management system as a continuous management process.

The direction of the future research can be justification of methodological approaches to the consideration of the peculiarities of administrative work of officials of management of oral mucous membrane.

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Анотація. Розглянуті підходи щодо оцінювання ефективності функціонування органу системи управління регіональними силами охорони правопорядку, що на теперішній час є актуальною проблемою. Актуальність пов'язана не лише зі складністю завдань, які вирішують органи зазначених сил, а і наявними людськими, матеріальними та часовими ресурсами, які виділяє держава і має система управління силами охорони правопорядку.

Ключові слова. ефективність, орган управління, сили охорони правопорядку, система управління, державне управління.

Doctor of Sciences in Public Administration,



Associate Professor, Operational Art Department
The National Academy of the National Guard of Ukraine

© Mykola Orlov 22.02.2017 year.

Reviewer: head of the Department of regional development and local government of Kharkiv regional Institute of public administration National Academy of public administration under the President of Ukraine, PhD of public administration, Professor Kuts Yu. O. (Куц Юрій Олександрович)



j12-023

DOI: 10.21893/2227-6920.2017-12.023

UDC 353.9+335.35

STATE APPROACHES OF FORMING OF MODEL OF COMPETENSES OF FUTURE ARCHITECTS IN A SPHERE TO THE MANAGEMENT

d.d.y., as prof. Orlov M.M. / док.держ. упр., доц. Орлов М.М.

ORCID: 000-001-000

National Academy of National guard of Ukraine,

Kharkov, ploscha Zahysnykiv Ukrainy 3, 61001

Національна академія Національної гвардії України,

Харків, майдан Захисників України 3, 61001

Abstract. On the basis of analysis of literature and knowledge of complication of profession of architect state approaches of forming of model of competenses of future architects are certain in the field of management. Reasonable requirement to the model of competenses of future architects in the field of management. The making charts of algorithm of model of competenses of future architects are certain in the field of management.

Key words: model, competenses, management, requirements, algorithm, architect.

Introduction. Preparation of the future architect of is a complex process based on the amount of tasks that he decides to practice. As we know architect (of Greek Αρχιτα – (chief orsenior) or Greek τέκτων (carpenter orbuilder) - "chief builder" it is a qualified person who carries on a professional basis architectural design (organization of architectural environment), including building design, the development of space-planning and interior design solutions.

These specialists must have not only special knowledge, skills and abilities, but also to some extent be managers - experts on specific management team or the organization and management of all types of resources they possess. The level of training in management can be evaluated by their competence by certain modeling.

Modeling competence begins with the use of special methods of analysis



competencies for each professional organizational structure. The analysis is performed by comparing the functional responsibilities of the expert and the knowledge, skills and possible actions in the difficult conditions of the situation, which it should have.

This model should be structured. *Structure competency model* is a comparison of multiple elements of the future model of competence between them. As a result, allocated general and partial signs carried by grouping these elements and features comparison between a groups of elements.

In the simulation performs several iteration (repetition), reviews and analyzes all the names and the definition of competencies from different sides. Active regrouping defined characteristics in different combinations.

Literature review. In [1, p. 55], stated that the modern theory and practice of modeling competencies can provide several approaches: *american* - which is based on the behavior of the person; *british* - based on functional traits person; *french* and *german*, which is determining the integrity of the person exploring.

Future specialist in architecture - is the creative person who should be aware of the many issues in management. Therefore, should modeling its competence taking into account not only the level of expertise and skills, but also a number of relevant to them.

Under the *concept of the future architect* will understand the personal qualities and abilities as well as his professional skills that are necessary for the successful execution of duties in the system of civil society.

In [2, p. 1042] (translation and modification of the article's author) *management* is presented as a kind of professional activities undertaken and aims to achieve the final result during any activity by rational use of all resources (human, intellectual, material, time, etc.).

Sometimes management is understood as the management or control. In [3, p. 17-23] presents the essence of the concepts of "governance" and "management" and their application in public administration. The essence of it comes down to certain rules govern, to act in a certain direction, manage, manage to be the owner and manager of something. However, the work [4, p. 63-64], the authors determined that



the state administration is a practical, organizing and regulating the state's influence on the social livelihoods of people with a view to ordering, storage or transformation, based on its own strength.

In accordance with article topics appropriate to consider scientific papers serving the term "model". In [5, p. 68] modeling is seen as the study of real objects. The author more attention to the technical objects. Along with this work [2, p. 1043] model of competence (translation and modification of the author of the article), as a tool to develop individual plans for professional development specific to each position in the specialty officer. These models describe the intellectual and professional qualities officer skills of interpersonal communication and allows us to plan staff development in two directions: a) adjust to the situation prevailing in a particular organization; b) the acquisition of knowledge, skills necessary for successful work in certain specialized professional field.

Based on the above on the author's opinion, the consideration of some state approach on formation of Competence model for future architects in management is a key issue and can be seen as an extension of the concept on the quality and capacity of individual - an architect, and his skills are necessary for successful performance of official responsibilities in the system of civil society.

The purpose of the article: Based on knowledge of the complexity of the profession of architect to define approaches to state-formation model future architects competences in the field of management.

The main text. In the work under the competency model future architect refers to a complete set of competencies and indicators behavior necessary for successful performance of duties in the system of civil society, which may vary according to the situation and the time, for a specific region (the area, businesses) with their specific goals and national culture and civil society.

As we know, *the region* - is the area the state, where the future architect can occupy a position of responsibility in state government and knowledge of management can improve its competence.

In fact, the model is a means of processing information to predictions of



processes and phenomena that is necessary for decision-making. In this capacity, modeling inherent in all objects of nature that must "decide" for its existence in an environment that is changing.

It is known that development of models requires some knowledge of general philosophical properties of the material world and the process of scientific knowledge. In practice has appeared that the *creation of adequate models* of real objects is a task that has no solution because any real object has an infinite number of properties, parameters and their relationships. Just remember aphorisms German philosopher Joseph Dietzgen: "Electron as inexhaustible as the atom!". But models had created and used for decision-making is as long as there is life.

For further clarity call Modeler – *researcher*, process or object that is modeled - *object modeling*, and the process of development and application model - *modeling*.

In general, the simulation includes three famous theory of knowledge stages: live contemplation object modeling, abstract thinking (construction object model), practical test and use the results of abstract thinking (model).

In the observation known only revealed part of the properties and characteristics of objects that can be used to build the model, but with these features directly using only those well-known researcher and also the most significant in terms of the purposes of analysis.

At the stage of abstract thinking essential aspects, characteristics and relationships of the object observed, often formulated as a *hypothesis* about its properties, the most significant for the purposes of analysis. The amount of such hypotheses are not equal to infinity, and is limited (finite) and can therefore be taken into account in the model. *Hypothesis* - (from the Greek base assumption) - is a scientific assumption, which is put forward to explain certain phenomena of reality [6, p.169]. These hypotheses briefly describe the main terms of the purposes of the *analysis* features of an object is the basis for building the model.

Thus, the object model can only impersonate of its features and links. So it (specified part) should be the most significant for the purposes of modeling. Given the above, it should be noted that the same object can build different models that will



meet the various objectives of the study. You can not create a single model for all occasions.

Features of the facility, taking into account the model always reflect only some of its parties, which in any case are significant, and the other may not represent practical value. Due to the peculiarities of the process of creating labeled models can be formulated four laws modeling [7].

The first law of modeling. The process of creating and applying the model to be tightly purposeful, ie before starting development model should be as accurate as possible to find out the real purpose of the object (modeled) as well as the purpose and conditions of application models that can more accurately select the object properties that reflect in the model and determine the direction of its creation. This provision is implemented through the answer - why do we need this model, what the researcher wants to get the information or do the following?

The second law of modeling. The information that is necessary to construct the model contained in any manifestations of a real object, process or phenomenon is modeling. This is the result of a philosophy known statement of the general relationship of objects and phenomena.

The third law. Modeling is not a separate act of creation of a specific model and cyclical process development, application and improvement. The law reflects the well-known assertion that the universe and its knowledge are in motion. Answers to each question received by the model inevitable give rise to a host of other issues. Therefore, the model developed should be suitable for continuous change and modernization. Knowledge of the law allows us to predict technological means upgrading models, which increases the chances of success of their practical application.

The fourth law modeling. Initial information needed to develop a model of the object is always incomplete because of infinity number of properties and parameters object modeled. The desire for a complete set of primary data to develop a model can not meet, resulting in the assumption of unknown parameters and conditions.

In the simulation of future architects competences in management is important



to define the required output.

Obtaining such data begins with the analysis of the characteristics of human resources candidates for the future post of architect:

1. Physical and biological capacity of individuals to master future profession.

Conclusions on these opportunities provide relevant medical institutions of Ukraine.

2. The level of general training in mathematics, physics and so on. A candidate for any office architect should know: a) math program graduate high school; b) in physics, as the program graduate from high school, and for special rate mechanics, building materials and so on.

3. Knowledge of psychology for effective interaction architect of the future regional executive authorities.

Undoubtedly the main competency model is the most future architect competence.

The competences of future architects management should be consider:

- knowledge of the organization as object and subject of management;
- ability to prove the essence of corporate governance (history, legal framework and practical implementation);
- knowledge about strategic management organization;
- the opportunity to prove the structure and processes of corporate governance;
- have some knowledge of cooperative management technology;
- ability to analyze the status and prospects of corporate management functions;
- knowledge of the sequence of decisions on the design and organization of the office of an organization;
- be able to organize the logistics of the organization;
- ability to respond to changes in the socio-political situation in the region of the state.

Obtaining these competencies carried out in teaching these people special programs agreed with the customer (by relevant ministries).

In practice, in the training of future architects simultaneously "working" school and each person independently. This is a complex issue that requires further



investigation. It will be associated to the definition of indicators of future behavior architects in management and constituent requirements and algorithm model of competence in this area.

Considering the proposals presented in the work [3], we can formulate the requirements and components of the circuit model algorithm future architects competences in the field of management.

Requirements model for future architects competences in management should be considered:

- it should not be difficult and easy to understand who uses it;
- have a fairly simple structure and clear language described;
- be relevant for all professionals, regardless of age, nationality, acquired knowledge in higher education, etc;
- consider possible changes in the future work and the application of the specialty;
- have indicators of behavior in society by any conditions of the situation that would not overlap.

The above, it is appropriate to determine the components of the circuit model algorithm future architects competences in the field of management:

- getting unbound set of characteristics and actions of future professionals within the common semantic field;
- grouping of characteristics and actions in certain semantic field;
- provide the names and exercise regrouping received at the beginning of competencies;
- the final formation of certain (necessary) competencies and competency indicators.

Summary and Conclusions.

Thus, in article discussed the concept of "competence" and "competency model" and their application in the system of evaluation of competence of future architects in management. These approaches in the theory and practice of modeling skills.

As the proposals can be present as follows:



- do not create models with a wide range of competencies and try to cover the entire array of information about future architects competences in management;
- referred to modeling should engage experts in the field of architecture and management.

Directions for further research will be submit in the practical implementation of article approaches the Kharkov State University of Architecture and Construction.

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Анотація.

Анотація. На основі аналізу літератури та знань про складність фаху архітектора визначено державницькі підходи щодо формування моделі компетенцій майбутніх



архітекторів у сфері менеджменту. Обґрунтовані вимоги до моделі компетенцій майбутніх архітекторів у сфері менеджменту. Визначені складові схеми алгоритму моделі компетенцій майбутніх архітекторів у сфері менеджменту.

Ключеві слова: модель, компетенції, менеджмент, вимоги, алгоритм, архітектор.

Аннотация. На основе анализа литературы и знания сложности профессии архитектора определены государственные подходы формирования модели компетенций будущих архитекторов в сфере менеджмента. Обоснованы требования к модели компетенций будущих архитекторов в сфере менеджмента. Определены составляющие схемы алгоритма модели компетенций будущих архитекторов в сфере менеджмента.

Ключевые слова: модель, компетенции, менеджмент, требования, алгоритм, архитектор.

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Reviewer: Prof.,Kuz U. O.

Article sent: 29/04/2017 of

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**j12-060****DOI: 10.21893/2227-6920.2017-12.060****UDC 005.95**

**ПРИНЦИПЫ СОЗДАНИЯ КОМАНДЫ – ЭФФЕКТИВНЫЙ
ИНСТРУМЕНТ УПРАВЛЕНИЯ**

**PRINCIPLES OF TEAMMAKING AS THE EFFECTIVE INSTRUMENT OF
MANAGEMENT**

**ПРИНЦИПЫ СОЗДАНИЯ КОМАНДЫ – ЭФФЕКТИВНЫЙ
ИНСТРУМЕНТ УПРАВЛЕНИЯ**

Mazur V.S. / Мазур В.С.

Ternopil National Economic University

11 Lvivska Street, Ternopil, 4600

Тернопольский национальный экономический университет

г. Тернополь, ул. Львовская 11, 46000

Аннотация. В работе автором предложен действенный механизм создания эффективной управленческой команды в современных условиях хозяйствования; принципы, методы и способы работы в команде; способность работы на результат через призму личностных качеств каждого представителя команды, учитывая психологические аспекты.

Ключевые слова: команда, лидер, проект, человеческие ресурсы, психологические факторы, новачки, принципы работы, креативность, интенсивная работа.

Summary. The article deals with an active mechanism of creating an effective managerial team under modern economic conditions; principles, methods and ways of work in team; the possibility to work for getting a result in the light of personal qualities of each representative of a team taking into account their psychological aspects.

Key words: team, leader, project, human resources, psychological factors, beginners, work principle, creativity, intensive work.

The effective organization of the system work of team management for business



is the main reason of a successful work, good organization and the fulfillment of which is the guarantee of success.

The following famous scholars in this area dedicated their works to team management: A. Chundler, A. Ansoff, M.X. Mescon, U. Woodcock, B. Karloff, U. Howard and others. Besides foreign developers, national scholars have been investigating this issue for a long time, they are: A.Ya. Kybanova, S. Kapustina, O.S. Vykhanskyy, O.N. Hromova, T.Yu. Bazarov, who emphasized, “Modern managers consider culture of their company as a mighty strategic instrument giving a possibility to orient all subdivisions and separate persons to common goals, mobilize initiative of workers and support productive communication between them”. Authors in their works suggest that personnel planning should be in the form of principal complex programs according to strategy of management of company development taking into account the main directions and tendencies of scientific and technical progress, estimation of team members and results of their labor activity and improvement of methods of team work.

A team is a group of people working together, combining their own aim with the common one and consciously cooperating with each other to achieve their common aim and doing it with pleasure.

Teamwork is one of the actual directions at the given moment in modern world of management. Life shows that for the work on a project it is necessary not only to gather perfect specialists but also costs are necessary. It is necessary to teach workers to be a single whole and to create a coordinated mechanism. However, to create a real team is not so simple, it is a real science [1].

Top manager of the company “Microsoft” said, “If you have a good family, then a team is the best family in the world. All are friends and love each other, and help each other. Who should take away a basket is not a question, that person who leaves he takes away it. Somebody was appointed and he according to the schedule does his job. Everybody can help each other and can be happy to do this”.

Ability to work in a team is an essential work function of each worker. Working in a team leaders should be energetic but not rude, they should be able to discuss



necessary problems for a project but not be distressed in case if a team has another opinion, and, what is more, everybody in a team should respect team members' work and point of view about a project.

It is known, that profit maximization depends on professional and successful work of a team. Personnel manager is the key person of management of human resources of a project. This person should be not only perfect manager but also a professional psychologist, because economic reasons and, mainly, psychological are of primary importance [2].

Team management requires patience and ability to delegate authority. It is necessary to have an imagination about skills of each member of a group and disseminate parts of a project to those members having corresponding habits in this area. Team management provides the leadership of discussions and recognition of different opinions. A team will not be able to show everything it can do without correspondent leader habits.

In permanent team, everything is adapted to the manner of making other members. However, before start to work, it is necessary to predict the possibility of everybody to express his own opinion during discussions, some managers recommend to make main rules and principles of teamwork [3].

Among all possible principles for teamwork, the following ones should be emphasized:

Table 1

Teamwork principles [4]

Teamwork principles	Content of principle
1. Principles of collective doing work.	Each team member does that part of common task, which was given him by a team and not that he was authorized usually to do.
2. Principle of collective responsibility	If task is not fulfilled, all team is responsible for it.
3. Principle of the only form of stimulation for a final result for a team.	Payment and other forms of stimulating team members are discussed with leaders beforehand. "Stimulation fund is created". Fund allocation is inside a team without leaders or customers participation.
4. Principle of autonomous self-government of a team.	Management of team members is done by team leaders but not by administrative leaders of an organization.
5. Principle of increased executive discipline.	Each team member answers for the final team result with his life. Each team member free takes



	the given principle.
6. Principle of free will to be in a team.	This is the key principle of team making. Only that candidate can be in a team, who free shows his readiness to be in a team knowing and understanding all conditions of a team activity.

Team members, except functional roles depending on the competency in some area, play social roles defining how the given member influences the process of done work. English investigator Belbin was the first who distinguished the following social roles of team members [5]:

- a thinker is characterized by increased creativity;
- an executor implements ideas and introduces arrangement in team actions;
- an estimator fulfills unprejudiced and critical analysis of a situation;
- an investigator of resources knows the art of negotiation and effective communication;
- a motivator is oriented on decisions of the given task and stimulates his colleagues to work more intensive;
- a collectivist harmonizes relations in a team and accommodates differences;
- a coordinator clearly formulates goals and he is a social leader; specialist has rear skills and habits.

The same person can play some roles simultaneously. The wider is range of roles the better team “player” he is.

The role of a team coordinator becomes special, the main task of which is to start the mechanism of self-realization, support a team development, accommodate differences, control emotions and free reach coordinative goals.

A big quantity of team management methods is used nowadays. The methods used by Ukrainian companies are essentially different from those ones used by world leading companies such as “Google”, “Apple”, “Toyota”, “BMW” and others. However, Ukrainian leading companies try to implement new team management methods gaining the experience of business “giants” to have an effective and successful teamwork.

Among different variants of team management methods, the main three can be recognized: authoritarian, democratic and delegation method, the methods of which are widely used in all spheres of productive and creative activity of teams [6].

Authoritarian method is the most inquired in the period of team formation when



skills of common work, vision of goals and ways are not formed. The manager, as a leader, shares his own vision, experience and effectively allocates resources. In this situation, a leader should have an authority among his subordinates not only as a person having power but also as a specialist, a skillful manager and a good instructor. There are disadvantages in authoritarian method: it decreases creative initiative of subordinates, makes worse social and psychological climate in a team and causes personnel turnover.

Democratic method is the most suitable for forming team relations on the base of good will and openness of leaders and subordinates. This is educative method. It supports gaining experience for joint actions, combines purposefulness connecting with tasks and people, methods of conviction and compulsion, supports initiative, interest of a person in his development, understanding tasks owing to the process of common decision making. The disadvantages of the given method are the following: additional spending of time for discussion of problems and in case of its deficiency, its effectiveness decreases sharply.

The delegation method is widely discussed among managers, it is the most complex one in use because it is for managers, who understand the situation very well, understand the levels of collaborators and share them only those duties they can do. The given method should be used only in high effective teams, which learned all levels of forming and development and have perfect motivated specialists. In this situation, a leader decides what, when and who can do something, and it causes irritation. Such team needs a leader, who is always ready to advise. Delegating the authority, he increases the employer's status what is important for those people, who have experience, knowledge and high qualification and want to work independently, and see in this the next stage of self-development.

For example, the volume of correspondence and discussions should be decreased [7].

Ability to listen carefully is an important point in management. Building relations in a team is impossible without communication between coworkers. Active listening, constant visual contact and support of interest in questions during a talk



will help to interest a coworker in communication and make it better. It is necessary to listen to people and do not wait the time to talk and give an interlocutor the possibility to be open. Pay attention to not only received information but also follow the gestures and try to understand and feel what was not said.

There can be conflicts in teamwork. Conflict is a zone of increased tension; it is always visible, because it has some external features: high level of tension in a team; decrease of ability to work; worsening of industrial and financial indications; change for the worse relations between suppliers and customers, etc.

It is necessary to differentiate productive, constructive conflict from rivalry and intrigues. During the conflict, which is considered constructive, only ideas and concepts are discussed, in no case, personal qualities of participants. Besides, during such conflict intensification of emotions, caps lock voice and mutual blames. Such scenes can look like serious quarrels. However, in teams, able for a constructive conflict, it is understandable that its purpose is to find optimal problem decision during the shortest period.

Conclusions. Summarizing we can make the following conclusions: under modern conditions, the main resource of management is availability of an effective team. The role of persons making the process of management increases sharply. The people's life and prospects of company's development depend on qualification, business activity, and ability to interact and achieve social significant result.

The most necessary personal quality among professionalism is specialist's ability to act in a team. The key reason of an effective work of a team is the ability of team member "to get the result". However, in practice, psychological aspect removes from the results of activity to interpersonal competition, what causes hidden and clear confrontation. Moreover, this in its turn leads to business and economic decrease; it forms tension inside the team and ruins the personality.

The possibility to work in a team gives every person serious support and prospects to develop as a person.

Thus, successful forming and effective functioning of teams in a company provide intensification the role of a manager as a leader, changes in the system of



management and communication in a company, changes of organizational culture and styles of management leadership.

Having investigated the given issue, the following practical advices for an effective management of a team to achieve the goal can be emphasized:

- 1) While transformation to team management it is necessary not simple to create teams but form labor processes.
- 2) Change of assessment of individual indications of work or their total cancelation.
- 3) Ascertainment of concrete and strict tasks to increase effective teamwork.
- 4) Creating proper work surrounding.
- 5) Interference in team business if it has problems.

Using these advices supports creating and management of teams under crisis conditions and achievement of effective results.

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**j12-061****DOI: 10.21893/2227-6920.2017-12.061****UDC 378****NEW TECHNOLOGIES IN THE FIELD OF EDUCATION****НОВІТНІ ТЕХНОЛОГІЇ В ГАЛУЗІ ОСВІТИ****Baranova O.V., Polyanskiy P.M., Artyukh V.O. /****Баранова О.В., Полянський П.М., Артюх В.О.***Mykolayiv National Agrarian University,**Mykolayiv, George Gongadze, 9, 54020**Миколаївський національний аграрний університет,**Миколаїв, Георгія Гонгадзе, 9, 54020*

Abstract. The questions on the use of new educational technologies. Analyzed theories, concepts, approaches new technologies. Principle of localization of maintenance of educational material is examined.

Key words: modern technology, modular training, module, personalization, student, specialization.

Introduction. Our country is an active participant of integration processes in higher education in European countries. Based on the principles of the Bologna Declaration, carried out the development and monitoring of higher education in Ukraine. In the context of the integration of higher education increased responsibility of higher education institutions by providing quality educational and research services. Therefore, you should make every effort to intensify the educational process, mastering advanced teaching methods, the use in the educational process methods and forms that are characteristic of European education.

The main text. One of the prerequisites for integration of higher education Ukraine to the European Higher Education Area is a change to the credit-module system of education. This system is a recognized European standard instrument for implementing mobility researchers, teachers and students. Modular training is considered one of the most modern and advanced technologies. It is intended to provide individualized educational programs and ways of learning, depending on the abilities, interests and educational needs of students. The effectiveness of modular



technology education proven experience of European and national institutions. It requires significant changes in the approach to the formation of learning content, structure and organization. This technology provides the ability to study individual variable part program for professional training, which is formed according to customer requirements, the interests of students will promote their self-development and prepare for life and profession.

In teaching science module teaching the subject of many studies both domestic (A. Aleksyuk, J. Balashov, V. Ryzhov, P. Yutsyavychene et al.). And foreign researchers (J. Rassel, M. Goldshmid, B Goldshmid et al.). The modular approach is seen as a natural result of the evolution of educational theory (N. Lavrentiev, M. Choshanov et al.). Designing the structure and content of education in a modular fashion with training experts examined in the works N. Borodina, N. Yerhanovoyi and others. The problems of transition from the traditional model of the educational process to the application of technology of modular training in terms of higher education institution analyzes G. Lavrentiev and N. Lavrentiev. Influence of modular training on mental processes underlying personality analyzes K. Vazina. The modular approach as effective learning system define J. Balashov and V. Ryzhov, building on the analysis of vocational training in developed countries. At the same time the development of modular training practices in higher education is far ahead of the construction of psychological and educational theory. To move pedagogical higher education system to the new quality requires further development of the theory of modular training, and with it – means scientific knowledge, forms and methods of complementary modular system that clearly meets the requirements of educational theory today. Development of conceptual frameworks modular training under psychological and educational theory – an objective necessity today.

The objective of this article is to analyze the new paradigm of higher education, including modular technology training in psychological and pedagogical aspects. Modular training – one of the modern and advanced technology, which provides a good individualized educational programs and ways of mastering depending on the abilities and interests of students. Modular training consists of individual modular



programs and plug – with modular units. In the modular units are modular learning module elements allocated to form specific concepts, skills, skills, practical admission or several professional techniques, actions, operations, processes associated with each other. The modular unit consists of educational elements; these may include lectures, practical and laboratory classes, independent work under the guidance of a teacher, course work and projects, individual complex problems, consult [1, 4, 6, 7]. Modular technology realizes in practice the following principles and rules:

- a clear statement of purpose;

- integration of various types and forms of education;

- large-organization of learning material with recommendations and objectives in his study;

- mostly independent study of students learning material;

- management students using (sequences of tasks and stages of learning) and learning of algorithms; openness methodical system of teacher;

- choice of student learning, forms, place and pace of study material;

- creating conditions for successful learning of the learning process;

- ability to work based on individual methods study of educational material, their way of learning;

- substantial operational current control and evaluation of the results on the final control.

Structural-component structure of the educational process, which is organized on a modular technology, creates conditions not only individualization of learning, but also a higher level – personalization of learning. This individualization of learning is seen as part of the training that personalization as personalization is the realization of human aspirations to be a person. The concept of personalization offered in 80 years of the 20th century in the field of social psychology A. Petrovskym [2]. This theory – a new approach to understanding individual, whose origins in the work of L. Vygotsky and A. Leontieva sotsiogeneza consciousness, initiated a general psychological theory of activity [3]. Modular technology realizes



the idea of personalized learning. Considering how personalization process by which the subject receives representation in the life of individuals and society can act as a person.

Personalize, is treated as a process by which the subject receives representation in the work of others and can act in public life as a person. This individual personality as it is made beyond the individual subject, the subject of updated links with others, joint activities with them. In our view, the theory of personalization fruitful in education, particularly in the training module. We have hypothesized that the implementation of ideas personalized learning promotes the formation of professional identity, provides a mutually beneficial development of the individual in the community of students and teachers; increase creative potential as students and teachers. In implementing the training, personalization in modular technology we used was the principle of localization content of teaching material. The essence of this principle is that after a brief description of the program of study of discipline teacher, student at will choose questions for in-depth study, we localized question is called the question semester specialization. The result of the student on this issue estimated the number of points corresponding rating. The decision to work on the issue of specialization semester students have to take a certain period of time from the beginning of the study subjects. The information had students in which modules and training elements which will demand their material semester specialization. Besides oral report on one of the occupation, localized content issues presented to the student in writing as a learning design presentation of the selected issue. The student analyzes the presentation to a number of sources, including lecture. This situation forces the student's choice of critical concern to the content of the material. In turn, this fact puts the teacher in terms of the need for continuous improvement of its scientific and objective level. Maximum rating score is assigned to the works of the students in addition to a broad representation theory point connections with various elements of the subject under study and other academic disciplines [4]. This requirement modular program to introduce students to the study of individual channel system analysis theory study, which is considered as a subsystem of different systems



(other subjects taught). These system components are represented super-system, as which in this case is the production process environment occupational functioning future professionals.

Work on the question semester specialization requires students to maximize independence and responsibility, and assumes the existence and development of his specific skills and abilities, including the ability to plan their training activities, including goal setting; the ability to use different sources of information (written, oral, computer), the ability to allocate the relevant factors, the basic idea to separate the important from the secondary; have the skills of presentation, quoting, systematization of educational material, information coding (drawing tables, charts, graphs). Experience in the standby module technology using the concept of personalizing learning shows that some students formed a fairly high level of local knowledge of the program of the course. Study subjects organized in a way that students are included in the educative activities. Level of education allows students to conduct local counseling other students (on the semester specialization), local assisting in lectures and workshops. In this activity students cautionary localized issues of specialization semester, but, nevertheless, the student already appears as the subject of local instructional activities.

A student in the educational process such prescribe exemplary status, which is linked with certain functions and duties requires a high level of training and responsible attitude to business. Status instructive creates ideal conditions for representation students about their characteristics, which makes enriching contributions to the development of their identity [5]. The variety of roles performed by one student, researcher, assistant, consultant and behavior leading to successful socialization in the learning process. Status instructive not only orders, but must be made by the student. Students can not formally apply to the implementation of research because it expects assisting, advising on the specialization semester may receive additional points, which will significantly improve its rating. All of these students is difficult to ignore. Experience shows in each study group of 30 to 45% of the students are eager to learn and question semester specialization reach this positive



result. Personalize Learning provides a high level of practical and theoretical training of both students and teachers. Sci-subject teacher level rises because local level student approaching him. Universal level of student increases due to the fact that his research into the semester specialization associated with other issues and discipline sections studied with other disciplines. In traditional education system is not expected specialization semester students because there are only two levels: the teacher and the general level of the student. At the level of teacher consistently and significantly above the level of the student. With modular training formed the third level – local level student approaching the level of the teacher in terms of traditional teaching. As a result of this approach, the level of teacher bound to be higher.

Summary and Conclusions. In this paper the implementation of training, personalization in modular technology used and the principle of localization content of teaching material. We obtained that a high level of scientific and objective training, appropriate local, is not every student enrolled, but only those who worked on issues semester specialization. However, in our view, this does not diminish the value of learning that personalization. In theory personalize argued that at a certain stage of social development of the individual as the individual quality system, serves as a special social value model for the implementation of individual activities of others. Thus, studies that personalization ensure the formation of students' ability to personalize, and that according to psychology, is a defining condition for their successful future career.

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Анотація. У статті розглянуто питання щодо використання новітніх технологій у галузі освіти. Проаналізовано теорії, концепції, підходи новітніх технологій. Представлений принцип локалізації змісту навчального матеріалу.

Ключові слова: сучасні технології, модульне навчання, модуль, персоналізація, здобувачі вищої освіти, спеціалізація.

Article sent: 03/01/2017 of

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**j12-062****DOI: 10.21893/2227-6920.2017-12.062****УДК 378, 37.062.2**

THE PROFESSIONAL COMPETENCE OF TEACHERS OF PHYSICAL TRAINING IN MODERN SCHOOL

О ПРОФЕССИОНАЛЬНЫХ КОМПЕТЕНЦИЯХ УЧИТЕЛЯ ФИЗИЧЕСКОЙ КУЛЬТУРЫ СОВРЕМЕННОЙ ШКОЛЫ

Pikalova T.V. / Пикалова Т.В.*M.Kh. Dulaty Taraz State University,**Kazakhstan Taraz, Tole bi 60**Таразский государственный университет им. М.Х. Дулати,**Казахстан, Тараз, Толе би 60,*

Abstract. Society is evolving and changing requirements for professional competence of the teacher of physical culture. Competence, creativity, research and information and communication technologies become mandatory components of the teacher.

Key words: professional competence, modern teacher, educational technology, health preservation, motivation, physical education.

Аннотация. Общество развивается, и меняются требования к профессиональным компетенциям учителя физической культуры. Компетентность, творчество, исследовательская деятельность и информационно-коммуникативные технологии становятся обязательными составляющими в работе учителя.

Ключевые слова: профессиональные компетенции, современный учитель, образовательные технологии, здоровьесбережение, мотивация, физкультура.

There are high requirements for teacher preparation for his philosophical and pedagogical positions, methodological, didactic, communicative, methodological and other competencies in modern society. The teacher should make the transition from traditional technologies to the developing technology, student-centered learning, use level differentiation techniques, training on the basis of competence approach, "case studies", project and research activities, information and communication



technologies, interactive methods and active forms of learning. The requirements for the functions, form and organization of the lesson changed.

A competent teacher will create conditions for the development of creative abilities, to develop in students the desire for creative perception of knowledge, to teach them to think for themselves, to independently analyze, simulate game situations, increase motivation to study the subject to encourage their individual inclinations and talents. The modern teacher is in constant creative search, and to find the answer to the current problem question "what to teach students?". Modern Teacher combines love for the cause and to his disciples, is able not only to teach the children, but he is able to learn from their students. Modern teacher must identify the best qualities inherent in the soul of each child, to encourage children to receive the joy of the acquired knowledge, using this knowledge, skills in adulthood. Graduates must be aware of their place in society and to work for his good, to be ready to participate in solving current and future challenges of our society.

The priority objective of modern education is not reproductive transfer of knowledge and skills from the teacher, and the full formation and development of student abilities alone outline a training problem, formulate an algorithm to solve it, to control the process and evaluate the result - to learn to learn. The main factors for building vector of personal development are the ability to navigate the sea of information and the ability to make the right decisions on the basis of data from different sources. Therefore, the physical education teacher has to navigate the world of the internet and possess computer literacy.

Currently, more than the teacher plays the role of an instructor, a mentor, a curator takes the position of the conductor. The student becomes an active participant in the educational process, not a passive listener. It is necessary to strengthen the motivation to knowledge, to show that the school knowledge and skills - a necessary preparation for life, individual interviews with students and parents, helps to work in this direction. / 2 /

Professionally competent teacher creates in his class of psycho-pedagogical conditions that allow in a single class collective work oriented than the "average"



student, and each separately based on individual cognitive and physical abilities, needs and interests.

In the design of the educational process should proceed from the recognition of two equal sources of learning and teaching. Doctrine is an independent, student-significant, and therefore very powerful source of personal development.

Traditionally, the educational process has been described as the educational, the main component of which is, training and education. On the organization of the last direct all efforts, since it was believed that a child develops only under the influence of specially organized pedagogical influences. One of the commonly used methods of teaching in the classroom is considered to be the work of students in groups, technology cooperation.

The teacher is not enough to form a group and give them an appropriate job. The essence consists precisely in the fact that the student himself wanted to acquire knowledge, develop skills. The problem of motivation of independent activity of students is no less important than the way of the organization, conditions and methods of work on the job.

It is cooperation rather than competition is the basis of learning in the group. Individual responsibility means that the success of the whole team (group) depends on the contribution of each participant, which provides support for team members to each other. Equal opportunities suggest that any student should develop their own achievements. It also means that every student learns by virtue of their own capabilities, abilities and therefore has a chance to be evaluated on an equal basis with others. /5/

Of great importance in the educational process has the nature of the relationship between the participants in this process. The positive nature of the relationship stimulates cognitive activity of students, increases its effectiveness. The teacher in the classroom should combine demands on students with an expression of respect, sensitivity and kindness to children. Not permitted by the teacher and rude tactless behavior towards pupils and colleagues. In order to identify violations of pedagogical tact and correction of behavior of the teacher and student psychological services are



held anonymous survey. Survey results are discussed with the administration of the institution. /1/

Teacher professionalism is defined by his professional suitability; professional self-determination; self-development, t. e. a purposeful formation of those qualities that are necessary for the performance of professional activities. The distinctive features of the modern teacher, teacher-masters are constant self-improvement, self-criticism, erudition and high labor discipline. Professional teacher growth is impossible without self-education needs. For the modern teacher it is very important never to stop there, and sure to go ahead, because the work of the teacher - is an excellent source for limitless creativity. An important place in the mood is to play a self-development training and working with the students at the university. This is where the foundation is laid for the professional skills of future teachers.

In terms of innovative changes in the sphere of education and the educational process is becoming particularly urgent problem of keeping healthy students, which reflects new approaches to these activities and the preservation of the health of the younger generation. The health of children in all societies and in all socio-economic and political situation is the most urgent problem and the subject of primary importance, because it determines the future of the country, the gene pool of the nation, scientific and economic potential of the company and, along with other demographic indicators, is a sensitive barometer of social and economic development of the country.

To generate interest in the subject is necessary to develop curiosity. The main role in achieving success plays a selection of special tasks, which allow children to take the initiative and creativity. Fun creates interest, and the degree of interest depends on the nature of the students' attention in class, his activity.

As a result of the work of the teacher, can bring assessment and pedagogical correction of the lesson of physical culture. The main tools are: an understanding on the part of teachers, positive incentives, underlining achievements of students, expanded evaluation of the results of its training activities, reliance on student's personality in a positive and assistance in preparing for the lesson at home. The



important role played by personal perspectives, creating in children the belief in their abilities. The rating does not exhibit for the final result, and for the process to obtain it, and, the student should be compared not with the others and with himself, but yesterday. / 3 /

Thus, increasing the level of physical fitness, creating a situation of success in physical activity, strengthening the need for regular physical exercise, personal example of the teacher, as well as contacts with the parents of pupils can solve any problem of physical culture.

Professionally trained teacher of physical culture depends on many factors, and is a huge effort, both on the part of the teacher and the teaching staff as a whole. Therefore, it should not be allowed to come to school to work "random" people who have no vocation to work with children. At the school administration is responsible for: who they allow to work with the students, and what control will be carried out throughout the entire educational process.

So, the new conditions of life, in which put all of us put forward their demands to the formation of young people entering into life: they must not only be knowledgeable and skillful, but also resourceful, independent, physically healthy and strong, with the development of moral - volitional qualities . Raising such people - this is the order of our modern society.

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EDUCATION, PSYCHOLOGY AND SOCIOLOGY

j12-014

DOI: 10.21893/2227-6920.2017-12.014

УДК 061.215(477/83 – 25)

**«NARODNA LICHNYTSIA» AS A REPRESENTANT OF HEALTHCARE
MOVEMENT IN HALYCHYNA (1903-1944)****«НАРОДНА ЛІЧНИЦЯ» ЯК РЕПРЕЗЕНТАНТ РУХУ ЗА ЗДОРОВ'Я У
ГАЛИЧИНІ (1903-1944 РР.)****d.p.s., prof. Bilavych G.V./ д.п.н., проф. Білавич Г.В.**

ORCID: 0000-0002-1555-0932

*Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Shevchenko, 57, 76025**Прикарпатський національний університет імені Василя Стефаника, Івано-Франківськ, вул.**Шевченка, 57, 76025***as. Bilavych I.V. / викл. Білавич І.В.**

ORCID: 0000-0003-4561-4690

*Medical University of Warsaw, Warsaw, ul. Żwirki i Wigury 61, 02-091**Варшавський медичний університет, Варшава, вул. Жвірки і Вігури, 61, 02-91*

Abstract. Founded in 1903 in Lviv “Narodna Lichnytsia” society was the biggest event in the history of Ukrainian public health system. Not only Ukrainians, but also Poles, Jews, members of other minorities received here a full medical assistance for free. It had a supranational character. This distinguished “Narodna Lichnytsia” from those of Polish or Jewish institutions where physicians carried about patients’ ethnicity. The activity of “Narodna Lichnytsia”, Ukrainian medical association (1910), Ukrainian hygienic Society (1929) and other health agencies eliminated the gaps in public health system and assisted the most vulnerable segments, including peasants, pupils, and students.

Keywords: “Narodna Lichnytsia”, Ukrainian medical association, Ukrainian hygienic Society, Metropolitan Andrey Sheptytsky.

Introduction. In the early twentieth century, under conditions of foreign states domination and political oppression of the Ukrainian people, national public associations of Halychyna created a public system of health care for population of the



region, thus offsetting gaps in the social policy of Austria-Hungary and Poland, in particular fighting against alcoholism [1]. Fight against alcoholism and smoking among children and adults in Ukraine is a problem of great importance these days. It has been raised by doctors, sociologists, psychologists, scientists, community, officials.

The main text. Foundation meeting of “Narodna Lichnytsia” took place in January 1903, it included 800 people. On October 1, “Narodna Lichnytsia” started its activity with four divisions: ophthalmic, surgical, therapeutic, gynecological, where Sofia Okunevska-Morachevska worked. Children’s section was opened the following year. As of 1906 it has already seven departments. All patients were provided with free medical care in “Narodna Lichnytsia“. It was very vivid social and national-atriotic design. In a speech delivered by Metropolitan Andrey Sheptytsky September 22, 1903 on the occasion of the consecration of the “cultural and humanitarian institution”, was stated that its a key task to help “poor and suffering humanity” "without national differences" [6, p. 20–21], which is meant here can get a full free medical care not only Ukrainians, but also Poles, Jews, members of other minorities. This distinguished “Narodna Lichnytsia” from similar Polish or Jewish institutions.

Treatment and examination of about 16 thousand patients was provided at the “Narodna Lichnytsia” till the beginning of World War I [2, p. 8–9]. Only in 1912 it had eight hospital departments, provided medical care to 3250 patients from the city and suburbs, in total there were 10,000 visits [2, p. 8–9; 5]. “Narodna Lichnytsia” has turned into a Russian hospital on the Russian occupation during World War II [2, p. 8–9]. In the early 1920s, “Narodna Lichnytsia” began to restore its activity. It was quite difficult to realize due to Polish occupation. After the war its first directors became Bishop Y. Botsyan (1918-1919) and prelate L.Kunytskyi (1919–1921). They and their successors – known doctors and public figures (S. Drymalyk, M. Vahnyanyn, I. Kurovets) improved physical infrastructure of facility, attracted to work on a voluntary basis or for a nominal charge best Ukrainian doctors and medical students [2 p.10–11; 5, p.78].

In 1920s, about 14-18 Ukrainian doctors who treated outpatient or inpatient with



6.5 to 8.3 thousand people each year were working at the institution. Many of them were doing complex surgeries for free and were provided with medical treatment. Medical students performed by 17-25 thousand reviews and advices annually. Such charitable activities of Lviv “Narodna Lichnytsia” had a wide resonance and recognition among the population of Western Ukraine. Therefore patients from all over Halychyna, Volyn, Holmshchyna came here for help. This medical care had supranational nature. In the first half of the 1930s 55% of patients were school students from education society UPT “Ridna Shkola” and Ukrainian unemployed, the disabled, widows, artists, teachers [4].

In 1927, there were 16 doctors in “Narodna Lichnytsia” (M.Panchyshyn, M.Muzyka, Tyt Burachynskyi, M.Vachnyanyn, Ya.Gynylevych, M.Dzerovych, L.Maksymonko, O.Podolynskyi, V.Kashubynskyi, S.Parfanovych and others). They treated near 16 thousands patients annually. In 1937 about every 12th Lviv resident sought medical help to the Ukrainian clinic. Among physicians need to add the following names: J. Rudnytska-Kryshtalska, N.Luk'yanovych, H.Lukyanovych, Ye.Durdello, Ya.Malys, O.Filyas, I.Hrynevetsky, O. Peleh, I.Simovych, I.Dovbush, B.Makarushka, M. Boyko, Yu.Kordyuk [1; 3; 4; 5].

One of the most important directions of the “Narodna Lichnytsia” development was building of a separate hospital. This idea emerged in 1921 and in the following year the first fundraising was made – \$200 [2; 6, p. 22]. In April 1928 was created a special committee of structure and construction commission, which included Ye.Burachynsky, O.Podolynsky, M.Halibey, M.Stefanivsky and others. For a decade with the help of 75 patrons and of the province population was collected more than 600 thousand zlotych. Metropolitan Andrey Sheptytsky, who was the patron of the “Narodna Lichnytsia”, gave a piece of land under the structure of the hospital [1].

It happened that sometimes Polish government committed bureaucratic obstacles, which would not prevent from the creation of another Ukrainian public health institution. Ukrainian parliamentary presentation, Metropolitan A. Sheptytsky and influential Ukrainian political, financial, economic and social organizations helped to overcome all difficulties. Hospital “Narodna Lichnytsia” was designed by



the best examples of its kind of European institutions. It was opened only in October 1938, although the first stone was laid in September 1930 [2; 6, p. 23–63]. Dr. Tyt Burachynskyy was a chief doctor. The hospital has 10 departments, including dental, analytical laboratory, physiotherapy room [2; 5; 6]. Hospital became one of the best medical facilities in Lviv due to its equipment, trained professionals and care for patients. Due to administrative obstacles, and most importantly due to the lack of necessary equipment and medical staff it was impossible to open such hospitals in the region.

Summary and Conclusions. Founded in 1903 in Lviv “Narodna Lichnytsia” society was the biggest event in the history of Ukrainian public health system. Not only Ukrainians, but also Poles, Jews, members of other minorities received here a full medical assistance for free. It had a supranational character. This distinguished “Narodna lichnytsya” from similar Polish or Jewish institutions where physicians carried about patients’ ethnicity. The activity of “Narodna lichnytsya”, Ukrainian medical association (1910), Ukrainian hygienic Society (1929) and other health agencies filled the gaps in public health system and assisted the most vulnerable segments, including peasants, pupils, and students.

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Анотація. До найвизначніших громадських інституцій у ділянці медичної опіки належить «Народна лічниця» у Львові. Її виникнення стало відповіддю на виклики, які постали перед українством на початку XX ст. Нагальною була потреба в такій установі, яка б надавала безкоштовну медичну допомогу людям, виховувала в них розуміння необхідності здорового способу життя. Її організатором став Євген Озаркевич. У «Народній лічниці» безкоштовно працювали лікарі, з-поміж яких – Софія Окуневська, Софія Парфанович, Мар'ян Панчишин та ін. Більшість з них належали до різних громадських інституцій, брали участь у лікарських з'їздах, де порушували проблеми здоров'язбереження дітей та дорослих. Самовіддана праця лікарів-патріотів репрезентувала рух за здоровий спосіб життя українців (а також представників інших етносів) наприкінці XIX – на початку XX ст.

Ключові слова: «Народна лічниця», Українське лікарське товариство, Українське гігієнічне товариство, митрополит Андрей Шептицький.

Article sent: 21/03/2017 of

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j12-053

DOI: 10.21893/2227-6920.2017-12.053

УДК 378:7.011.3

METHODS OF COGNITION IN THE CONTENT OF FOREIGN LANGUAGE TEACHING FOR STUDENTS OF HIGHER PEDAGOGICAL SCHOOL

Hushko O.A. / ст. викл. Гушко О.А.

*Kryvyi Rih Economic Institute of
State Higher Educational Establishment «Kyiv National Economic University named after
Vadym Hetman», Kryvyi Rih, Karl-Marx Avenue, 64, 50000
Криворізький національний університет ДВНЗ «Київський національний економічний
університет імені Вадима Гетьмана», Кривий ріг, вул. Карла Маркса 64, 50000*

Abstract. The article introduces the tactics for application of methods of cognition in the content of professional training of the students of higher pedagogical school. The author represents the system of methods used in the process of foreign language teaching and learning. These are methods of abstraction, analogy, classification, induction / deduction and modelling. The author gives examples of methods of cognition applied as teaching methods.

Keywords: students of higher educational school, methods of cognition, teaching methods, professional training.

Introduction. Competence approach is leading in the modern educational sphere as it is able to provide the appropriate educational environment for the development of professional competence of students of higher educational schools in the process of foreign language learning.

Foreign language teaching as part of humanitarian training of university students is constituted on the system of teaching principles. These are the principles of scientific accuracy, fundamental nature, systematic character and systemic nature, interdisciplinary connections, connection between theory and practice as well as learning and life, accessibility, stability and dynamism, unity of scientific and academic processes. The development of professional competence of students, therefore, is closely interrelated with the application principles of methods of



cognition (A. Aleksyuk, S. Arkhanhelskyi, V. Bepalko, V. Bondar) and methodical bases for the introduction of innovative technologies (V. Bepalko, I. Bogdanova, I. Dychkivska M. Zhaldak, I. Pidlasyi, S. Sysoieva).

Methods of cognition as a system of rules and techniques of the approach to the study of phenomena and regularities of the objects under study optimize the management process of teaching and learning activities of university students.

The purpose of the article is to characterize the methods of cognition used in the process of teaching and cognitive activity of future philologists.

The main text. Methods of cognition as teaching methods represent a complex system in the content of professional training:

1. *Abstraction* is the process of formulating generalized ideas or concepts by extracting common qualities from specific examples. In the content of foreign language teaching we primarily refer to abstract classes, properties, relationships, abstraction of identity / uniformity, invariance / variance which are indispensable in the process of concept formation, recognition and classification of objects of cognition. As an example we can take the style variation in the use of lexical items or the content definition of lexical items under study when analyzing the concept of lexical and semantic system (paradigmatic relations, syntagmatic relations, epidigmatic relations).

2. *Analogy* is an effective method for describing objects of cognition in the process of mastering scientific knowledge and clarifying the correlation of characteristics among different types of objects. It can be also effective for forecasting and setting up academic hypotheses. In the process of foreign language learning we refer to a genus-species relationship, grammatical correlates of substantives in Ukrainian and foreign languages; forming of comparative forms in languages under comparison.

3. *Classification* is effective as a means to represent the content of subject knowledge in the process of foreign language learning by organizing and ordering the material on particular mutual basis. The usage mode: adducing the method as a strategy for solving an educational task; determining the basis for classification,



finding the most expressive and easy form to present the content under research. It is impossible to overestimate this method while working with a significant number of generalized objects. The special scientific method of classification can be used in the error classification (correlated to the levels of the language system).

4. *Modelling* provides imaginative support at the stage of generalized orientation in the researched subject field; constituted on the reproduction of relations and properties of the simulated object through certain laws (formulas); the image makes an idealized picture of the phenomenon, which is given by the plot of the task).

A special scientific modelling method is in close relationship with the technique of immediate constituents which contemplates to use the mode of representation of word-formative structure and syntactic structure of phrases and sentences as a hierarchy of components according to the rules of division.

The transformational analysis is a form of modelling. It is based on the concept that underneath any complex syntactic structure there is a simple one. Due to that using a small set of transformation rules you can change simple structures into complex ones. Modelling of descriptive and expressive means is constituted on nationally marked cultural properties, so hermeneutics of a literary text should include the analysis of the levels of national mentality.

Modelling of communicative situations must be realized with due regard for socio-cultural reality and also cultural specificity (the notion 'culture bearer' usually describes the human consciousness, which has been formed in the process of mastering a particular national culture). Elements and categories of a language code of each idioethnic language form unique language pictures of the world which are different from the conceptual (scientific) world-images. The impact of national and cultural factors on the semantics of separate words and therefore fragments of linguistic world-images is quite significant.

5. *Induction/deduction* is the generalization, the function of which is associated with the prediction of results from observation and experiment. Inductive generalizations are partly regarded as research truths and empirical laws. Another form involves the transition from general to specific, the system of considerations,



where, proceeding from some statements (truths) you can reach certain deductions. It is effective in the process of a discourse where there is a logical expansion of the chain of deductive inferences. In the course of foreign language learning these methods are effective for ascertaining with particular cases in which we can state some regularity. Induction method mastering is carried out in the process of solving different types of tasks and considering a number of particular phenomena, the essence of which can be explained by a rule or regularity.

The method of induction allows mastering the methodology of scientific and cognitive activity, which contains scientific tools. Dialogic discourse involves inductive reproduction of further replica items. The peculiarities of using the analysed method are worth attention at the stage of synonymous, antonymous, patronymic, hyponymic and homonymous correlations in lexical systems of native and foreign languages.

Mastering the categorial and methodical apparatus promotes forming of professional competence of future specialists in humanities.

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Аннотация.

У статті запропоновано тактики застосування методів пізнання у змісті фахової підготовки студентів вищої педагогічної школи. Запропоновано систему використання під час вивчення іноземної мови методів абстракції, аналогії, класифікації, моделювання, індукції / дедукції. Наведено зразки застосування методів пізнання як методів учіння. Окремого розгляду набуло питання моделювання у змісті фахової підготовки майбутніх філологів. Моделювання комунікативних ситуацій має здійснюватися з урахуванням соціокультурної дійсності, а також культурної специфіки (поняття «носії національної культури» зазвичай описує свідомість людини, яка сформувалася у процесі оволодіння певною національною культурою).

Ключові слова: студенти вищої педагогічної школи, методи пізнання, методи навчання, фахова підготовка.

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Supervisor: prof. Mishenina T.M. (d.ped.s., Kryvyi Rih State Pedagogical University)

Article sent: 02/04/2017 of

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DOI: 10.21893/2227-6920.2017-12.006

**FORMATION OF MOTIVATIONAL SPHERE IN MEDICAL
STUDENTS DURING THEIR VOCATIONAL TRAINING**
**ФОРМУВАННЯ МОТИВАЦІЙНОЇ СФЕРИ СТУДЕНТІВ-МЕДИКІВ
У ПРОЦЕСІ ПРОФЕСІЙНОЇ ПІДГОТОВКИ**

с.т.с., Bilyk L.V./к.пед.н., Білик Л.В.

ORCID: 0000-0001-9241-6721

Cherkasy Medical Academy, Cherkasy, Chreschyatyk str., 215, 18000

Черкаська медична академія, 18000, м. Черкаси, вул. Хрещатик, 215, 18000

Abstract. The Article deals with topical issue of motivational sphere formation in medical students during vocational training activities aimed at professional internalization of values. One of the teaching conditions implementation experience was summarized by use of a development exercises complex, organizational-activity games, numerous trainings, creation of situational task system with increasing difficulty and problematicity, modern innovative technologies of communication skills development, mentoring and active social position during the experimental work. Formation of motivational sphere was covered with reference to preparing nurses to carrying out palliative and hospice care.

Key words: vocational training, palliative expertise, training, nurses, bachelors of medicine.

Reform of public relations and modernization of educational system stipulate new requirements for future specialists training quality. Nowadays the growing need in advanced, competent professionals able to cooperate under the principles of humanization, requiring their self-confidence, ability to self-development and self-realization arises. Competitive specialists should be professionals in their fields and not to feel stress and anxiety in carrying out their professional activities.

Presentation of the basic material. Analysis of current research concerning training issues of future healthcare professionals shows the main tasks of the motivational sphere forming during vocational training of medical students aimed at professional internalization of values.



Professional development of any individual is impossible without the development of professional motivation having its inherent comprehensive hierarchical structure of reasons. N. Voropay outlines: “Motivation, as well as other higher psychological functions are socially based phenomenon occurring and changing in course of human life and individual psychological activity; motivational and need area is developing in a holistic process of intellectual and operational areas, and only in this case we can speak about their interaction and mutual influence [1, p. 21].”

Various aspects of motivation have been researched by such scholars as E. Ilyin, M. Kagan, D. Leontiev, S. Maksimenko, A. Maslow and others. Among the researchers, who have studied motivational sphere development in medical students, O. Bober, N. Vishnievska, N. Kurenkova, A. Fit'mova and others can be noted.

The study by O. Kokun focuses on students, who master “Person to Person” professions, in particular, medical psychologist profession, which requires mastering of professional medical knowledge and qualification, and skills of practical psychologist. The results of author’s research prove that students mostly have high external positive motivation rates with regard to professional activity, which are higher than the negative external motivation. However, the level of intrinsic motivation requires certain correction. After analyzing the results of his study, O. Kokun proposes to develop a special correction program aimed at reduction of emotional loads on the motivational component of students’ and medical psychologists’ professional development. The researcher proposes to complement the program with academic exercise aimed at improving teaching and learning motives, professional ones and motives related to professional skills and creative self-actualization, as well as internal activity motives. Exercises aimed at building of relationships with fellow students and teachers, self-validation, increase of professional knowledge and skills level and level of interest in learning are, according to the author, important aspects of such correctional program. Students should pay particular attention to the state of their health, which influences both the quality of life and the student’s performance during the training hours and training days [3; pp.



101-103].

Thus, the students were proposed to render urgent medical care to an imaginary patient (a student from the same group) under a certain diagnosis. In case the medical care was carried out in a proper way, the patient had to thank the “doctor”, triggering positive emotions and willing to work within the chosen specialty.

The second way of motivational sphere forming in future bachelors of medicine was the following: students received certain motivation, goals, and ideals in the finished form. Their task was to transform these from the ones perceived externally into real effective motives. For this purpose such methods as explanation, persuasion, example, and so on, were used. For example, individual interviews, suggesting direct and indirect questions about motives of students in choosing of their profession, need in employment in particular hospitals, ability to work with terminally ill people, and other questions, were used in practice of experimental work with students. Students were provided with valuable advice and explanations concerning the need to choose to work with palliative care patients.

Taking into consideration that manifestation of empathy as the capacity for understanding, sensitivity to others' pain, willingness to help seriously ill ones is very important in palliative medicine, students were offered a training exercise where they learned to equate themselves with fellow students, teachers, and patients. It helped medical students to learn interactivity person-to-person mechanisms such as identification (understanding and interpretation of behavior and actions of others through self-equation with them).

Intense education, which, as T. Husak and V. Krylova believe, is the learning process introducing active methods, especially training games, based on innovation and organizational-activity games, is an important motivating factor. In such games, according to the authors, a shift from unilateral to multilateral knowledge of partial knowledge about the object, and its simulation with release of major conflicts takes place, but not just the acquisition of decision-making skills [2]. A. Mutihulina and L. Shulgin also share this opinion. Taking into account the opinion of the aforementioned authors, we used game trainings described below in our experimental



work.

Training 1. “Me and my name.” Objectives: to understand their own personality characteristic features, to achieve a higher level of self-consciousness. Each of the participants of the training was offered to give his name and personal characteristics for each symbol of the name. The training starts from the leading participant, and he is followed by all other medical students.

Training 2. “Who am I?” Objective: to give oneself adequate self-esteem. Each participant is asked to answer the question “Who am I?” and to write down the answer. It is desirable to write at least 10 answers, characterizing the person from different perspectives. All participant’s characteristics, traits, interests, emotions beginning with the letter “I” should be listed, i.e.: I am a capable student; I am a loving daughter; I always want more; I am an optimist. Then in turn each read their personal characteristics, all others should listen carefully to subsequently express their views on the characteristics adequacy of particular students.

Training 3. “Tell about a feature valued most.” Objective: to discover personal preferences. Each of the participants of the training was offered to think about what trait he or she likes in people above all. After this consideration the participants were proposed to recall (or create) a short story describing a case in which the selected personal feature would be a valuable one. At the end of training sessions the group discusses take place in order to answer the question: “Is the feature described in the story valuable for you?”

Conclusions. Thus, formation of motivational sphere in future bachelors of medicine included use of a comprehensive set of exercises aimed at involving students to a particular activity, based on their needs, in course of the experimental work.

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Анотація. Стаття присвячена актуальній проблемі формування мотиваційної сфери студентів-медиків у навчальній діяльності, спрямованої на інтеріоризацію професійних цінностей. Узагальнено досвід реалізації однієї з педагогічної умови шляхом використання в процесі експериментальної роботи цілого комплексу розвивальних вправ, організаційно-діяльнісних ігор, численних тренінгів, створення системи ситуаційних завдань зростаючої складності й проблемності, сучасних інноваційних технологій розвитку комунікативних вмінь, наставництва й активної соціальної позиції. Формування мотиваційної сфери висвітлено в контексті підготовки медичних сестер до здійснення ними паліативної та хоспісної допомоги.

Реформування суспільних відносин та модернізація системи освіти висувають нові вимоги до якості підготовки майбутніх фахівців. На сучасному етапі зростає потреба в розвинених, компетентних спеціалістах, які спроможні будувати взаємодію з урахуванням принципів гуманізації, що вимагає від них упевненості в собі, здатності до саморозвитку та самореалізації. Конкурентноспроможний фахівець має бути професіоналом своєї справи, не відчувати напруженості і тривожності при здійсненні професійної діяльності.

Аналіз сучасних досліджень, що стосуються проблеми професійної підготовки майбутніх медичних працівників дає нам можливість визначити основні завдання формування мотиваційної сфери підготовки студентів-медиків, які спрямовані на інтеріоризацію професійних цінностей.

Отже, формування мотиваційної сфери майбутніх бакалаврів медицини передбачало застосування у процесі експериментальної роботи цілого комплексу вправ, які сприяють залученню студентів до певної діяльності, спираючись на їхні потреби.

Ключові слова: професійна підготовка, паліативна компетентність, тренінги, медичні сестри, бакалаври медицини.

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Article sent: 03/03/2017 of

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j12-007

DOI: 10.21893/2227-6920.2017-12.007

**ESTIMATION CRITERIA FOR LEVELS OF FORMATION OF
PROFESSIONAL COMPETENCE OF FUTURE MEDICAL SPECIALISTS
КРИТЕРИИ ОЦЕНКИ УРОВНЕЙ СФОРМИРОВАННОСТИ
ПРОФЕССИОНАЛЬНОЙ КОМПЕТЕНТНОСТИ БУДУЩИХ
МЕДИЦИНСКИХ СПЕЦИАЛИСТОВ**

с.р.с. Radziievska I.V. / к.пед.н. Радзиевская И.В.

ORCID: 0000-0002-5216-1928

*Cherkassy medical academy, Cherkassy, Khreschatik street, 215, 18000**Черкасская медицинская академия, Черкассы, ул. Крещатик, 215, 18000*

Annotation. The paper presents the method of estimation of medical students' professional competence based on their acquisition of key professional expertise when studying professional disciplines. Such estimation of quality of training of a specialist allows determining parameters and criteria for professional and practical properties of characteristics that meet the needs of the society and labour market. At this stage of development of the pedagogical science when estimating professional competence and quality of professional training of specialists two groups of diagnostic methods are used: estimation of professional competence based on higher education standard; estimation of professional competence of the future specialist as a personality.

To diagnose formation of professional competence of the future medical specialist the following didactic criteria: motivational and personal, informational and cognitive, practical and operational and levels: high, sufficient, moderate, and low were used. Each of the criteria suggested is estimated based on key personal, key professional and instrumental expertise, acquired by future medical specialists, being the ground for formation of professional competence.

Keywords: professional competence, didactic criteria, formation levels, key expertise.

Introduction. Process of formation of professional competence of the medical



worker as a future healthcare specialist is influenced by many factors affecting formation of character, attitudes, motivation and emotional sphere of the student, as well as his/her personality in general.

Since the goal of a higher medical educational institution is training of medical specialists, its main objectives are: ensuring of organization of professionally motivated activity of students; using of the person-centred and competency-activity approach to learning; intensification of independent work of students.

The end result of the person-centred and competency-activity approach would be the most complete assimilation of knowledge and skills, formation of professional culture and other personal qualities, formation of creative self-development of the future specialist, i.e. those qualities that together are defined as professional competence.

Levels of formation of professional competence can be determined only if a clear criteria base is available. Speaking about criteria for estimation of quality of training of medical specialists it is necessary to emphasize that the end criterion for teachers' work is the results of educational process, level of professional knowledge and skills of students. Therefore it no coincidence that the following issues were studied: improvement of quality of practical training of medical specialists, detailed mastering of practical skills with every student, so that graduates while working at healthcare facilities could feel themselves confident, could use acquired knowledge in their everyday work.

Main text. When investigating the problem of formation of professional competence of future medical specialists the analysis of psychological and pedagogical literature showed that formation of professional competence is estimated by different criteria.

In scientific literature the term criterion means qualities, properties, characteristics of studied phenomenon that give the possibility to evaluate, identify or classify state, levels of functioning and development, in other words it is a measure of estimation. Criterion (Gk. kriterion – a means for judging) – means, ground, evaluation measure for something.



There are logical (formal) and empirical (experimental) criteria of truth. Formal criterion of truth is the logical laws: truth is everything that is not contradiction, and is logically correct. Empirical criterion of truth is knowledge matching experimental data. Criteria are determined by relevant indicators that specify a set of requirements and are quantitative or qualitative characteristics [127].

O. Lapina considers that criteria for estimation of formation of professional competence are: level of knowledge, when knowledge is a prerequisite of behaviour efficiency; active intention to teaching profession and self-perception as a sense of belonging to it; comfort in profession; professional and creative independence; life experience; capacity for reflection; communicative culture; ability to carry productive cooperation; satisfaction with results [127].

O. Nasonova [171] in her research provides the following main criteria for determination of formation of professional competence: procedural and activity approach that includes professional skills (construction and organization of activity); individual and personal approach – presence of inner need for teaching activities, reflection and creative elements.

A. Busygina considers that professional competence is the integrated systemic property of the personality with the following structural elements: professional substantial (basic component), professional activity (practical component), and professional personal element, that includes professional and personal characteristics of the specialist and subject [43].

In his paper R. Marr divides skills and properties of manager into three blocks [247, 254]: professional competence (specific knowledge and skills in a particular area); methodical competence (ability to perceive and interpret information, ability for systems thinking); social competence (ability to communicate, cooperate and solve conflicts). Other scientists think so as well (V. Kalinin, A. Istomin) [106, 108].

P. Obraztsov considers that criteria for formation of professional competence of military specialists is a set of objective and subjective indicators that give qualitative description of its condition, based on which its essential properties and measure of performance can be found [178].



Thus, scientists interpret the term “criterion” as a measure of estimation, judgment, and the term “levels” as a degree of size, development, significance, etc.

O. Uvarkina while studying formation of communicative culture of students of higher medical educational institutions uses such criteria for formation of communicative culture of medical students: cognitive (reflects the level of assimilation of knowledge about the norms and values of communication, various communication algorithms and degree of mindfulness of participation in communication), emotional (reflects the level of satisfaction with the process and results of communication and emotional enthusiasm with interpersonal relationships) and instrumental (reflects the level of student’s mastering of basic communicative skills, means of effective interaction and reflection). She proposes four levels to determine formation of students’ communicative culture: perfect, basic, sufficient and elementary [245].

V. Bespalko [27, 28] gives the following requirements for criteria for estimation of the level of formation of professional competence: criteria should be adequate to those phenomena characteristic of which they are; should clearly reflect the nature of the phenomena measured and dynamics of measurement, expressed by criterion of property; criteria should meet didactic goal, characterize connection between it and results of study; criteria should be expressed in such pedagogical concepts that can be subjected to quantitative analysis; criteria should ensure relative ease of measurement, ease of calculation, availability and ease of use; criteria should allow estimation not only of the scope, but of the quality of knowledge and skills as well, not only formal results of study, but creative work of students.

Summary and Conclusions. The investigation proved that professional training of the medical specialist involves not only professional, but personal qualities that characterize his/her motivational, emotional, intellectual, volitional and other sides.

During the research we defined the levels of formation of professional competence of future medical specialists (low; moderate; sufficient; high), used didactic criteria: *motivational and personal, informational and cognitive, practical and operational* and derived a relevant estimation scale:



1) low level is characterized by incomplete knowledge, fragmented and basic reproduction of educational material caused by vague and fragmented representations about the subject of study; poor expression of such spheres of the personality as operational and technical, intellectual, emotional, volitional, the student demonstrates low level of theoretical knowledge in professional-oriented disciplines, can't use them in unusual situations, in practice student's work is non-systematic and primitive, there is no professional orientation of the personality, no practical skills are formed;

2) moderate level is characterized by incomplete knowledge, ability to reproduce main educational material, but not meaningfully enough, inability to analyse some events, make conclusions, average ability to perform manipulations under the algorithm of practical skills; is characterized by sufficient knowledge of theoretical material, ability to use it for solving standard situations, but inability to evaluate patient's state, determine patient's problems, make conclusions, lack of vision for use of acquired knowledge in practical work.

3) sufficient level is characterized by knowledge of essential features of concepts, events, patterns, relationships between them, ability to use knowledge in standard situations, make mental operations (analysis, abstraction, generalization, etc.), ability to make conclusions, correct mistakes, ability to perform basic types of practical activities, satisfactory knowledge of theoretical material, ability to use it to solve unusual situations, ability to estimate patient's state, make conclusions, but inability to use acquired knowledge in further practice;

4) high level is characterized by deep, strong, generalized, systemic knowledge of disciplines, ability to use knowledge in practice, practical work is exploratory in nature, marked by the ability to evaluate various life situations, events, facts, detect and defend personal position, perform typical tasks at a high level, excellent knowledge of theoretical material, ability to use it to solve unusual situations, ability to estimate patient's state, ability to make conclusions and use acquired knowledge in practice.

Each of the criteria suggested is estimated based on key personal, key professional and instrumental expertise, acquired by future medical specialists, being



the ground for formation of professional competence.

Motivational and personal criterion characterized the system of personal qualities of the student – motivation before study, motivation before professional activity, development of reflexive abilities, formation of leadership qualities, formation of readiness to learn (key personal expertise).

Informational and cognitive criterion – development of creative and research activities, scope and quality of mastering of special knowledge from the cycle of professional disciplines, strength of acquisition of knowledge, performance of professionally oriented tasks (instrumental and professional expertise).

Practical and operational criterion – mastering of professional skills (subject-practical, sign-practical), ability to use knowledge and skills in professional activities of the medical specialist (instrumental and professional expertise).

Levels of formation of professional competence were diagnosed according to the following indicators: generalization of educational material; mastering of production functions (technological, organizational, technical, social, industrial, controlling, analytical and educational). The list of competencies listed in the standard of higher education is defined as the ability of the medical specialist to perform a certain scope of work: ability to act based on relative physical storage media; ability to act based on constant mental control without use of physical storage media; ability to act on skill level.

Therefore, levels of formation of practical skills are a “guided practice” with required uninterrupted actions and teacher’s control. Accumulation of professional experience begins with practical training, students perform medical procedures on their own, professional skills are mastered at clinical sites until they become automatic. Students reach the third and fourth level of formation of practical skills gradually after passing all stages of training, work placement and pre-graduate practice. Along with improvement of practical training of students professional competence of future specialist is formed and improved.



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Анотація. В роботі розглядається методика оцінювання професійної компетентності студентів-медиків на основі набуття ними ключових професійних компетенцій у процесі вивчення фахових дисциплін. Така оцінка якості підготовки спеціаліста дозволяє визначити параметри та критерії професійно-практичних властивостей характеристик, що відповідають потребам суспільства та ринку праці. З метою діагностики сформованості професійної компетентності майбутнього медичного фахівця, застосовано наступні дидактичні критерії: мотиваційно-особистісний, інформаційно-когнітивний та практично-операційний та рівні: високий, достатній, середній, низький. Кожен із запропонованих критеріїв оцінюється за допомогою набутих майбутніми медичними фахівцями ключових особистісних, ключових професійних та інструментальних компетенцій, які є підґрунтям формування професійної компетентності.



Вступ. Процес формування професійної компетентності медичного фахівця, як майбутнього спеціаліста сфери охорони здоров'я проходить під впливом багатьох факторів, що впливають на становлення характеру, ціннісних установок, мотиваційної та емоційної сфери студента та його особистості в цілому.

Оскільки метою діяльності вищого медичного навчального закладу є професійна підготовка медичного фахівця, то основним його завданням є: забезпечення організації професійно-мотивованої діяльності студентів; застосування особистісно-орієнтованого та компетентісно-діяльнісного підходу до навчання; активізація самостійної діяльності студентів.

Визначити рівні сформованості професійної компетентності можливо тільки за наявності чіткої критеріальної бази.

Основний текст. Під час дослідження проблеми формування професійної компетентності майбутніх медичних фахівців проведений аналіз психолого-педагогічної літератури показав, що сформованість професійної компетентності оцінюється різними критеріями.

Діагностика рівнів сформованості професійної компетентності проводилась за наступними показниками: узагальнення навчального матеріалу; володіння виробничими функціями (технологічною, організаційною, технічною, соціально-виробничою, контролюючою, аналітичною та навчальною). Перелік компетенцій, що зазначені у стандарті вищої освіти, визначні як здатності медичного фахівця виконувати певний обсяг роботи: здатність виконувати дію, спираючись на матеріальні носії інформації щодо неї; здатність виконувати дію, спираючись на постійний розумовий контроль без допомоги матеріальних носіїв інформації; здатність виконувати дію автоматично, на рівні навички.

Заключення та висновки. У результаті дослідження доведено, що професійна підготовка медичного фахівця це не тільки фахові, а й особистісні якості, що характеризують його мотиваційну, емоційну, інтелектуальну, вольову й інші сторони.

Рівні сформованості практичних умінь і навичок є «керованою практикою» де потрібні безперервні дії й контроль викладача. Накопичення професійного досвіду починається з навчальної практики, медичні маніпуляції студенти виконують самостійно, а на клінічних базах відпрацювання професійних навичок доводиться до автоматизму. Студенти досягають третього та четвертого рівня сформованості практичних умінь і навичок поступово після проходження усіх етапів навчальної, виробничої та переддипломної практик. Паралельно з удосконаленням практичної підготовки студентів формується і удосконалюється професійна компетентність майбутнього фахівця.

Ключові слова: професійна компетентність, дидактичні критерії, рівні сформованості, ключові компетенції.

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Article sent: 03/03/2017 of

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j12-026

DOI: 10.21893/2227-6920.2017-12.026

APPLICATION OF INFORMATION TECHNOLOGY FOR EDUCATION**STUDENTS****ПРИМЕНЕНИЕ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ ДЛЯ****ОБУЧЕНИЯ СТУДЕНТОВ****master's degree Koren E.V. / магистр Корень Е.В.***Kherson State Agrarian University, Kherson, Stretenskaya 23, 73006**Херсонский государственный аграрный университет, Херсон, ул. Стретенская 23, 73006*

Abstract. The paper considers the use of information computer technologies for effective student education. Positive and negative aspects of the use of modern information technologies from the point of view of psychology are analyzed.

Key words: information technologies, electronic manual, independent work of students, didactic principles, computer anxiety.

Introduction. Modern education is becoming an increasingly complex system that has to operate in a dynamically changing world, which demands ever increasing demands on all participants of the educational process.

According to UNESCO, the number of students in the world has so far been growing. Demand for educational services today exceeds supply. The restriction of the supply of educational services is largely determined by the difficulty of accompanying learning materials, their adaptation to the needs of trainees and to the dynamics of the development of knowledge areas and new technologies [1].

For the education system to be ready to face the challenges of the 21st century, certain transformations of the system based on the use of modern information technologies are needed. The main hopes are laid on the creation and maintenance of information and educational environments, the development of new object technologies for the creation of training materials, along with the development of traditional technologies for developing electronic textbooks and multi-agent technologies for educational portals.

The use of information technology (IT) is closely related, on the one hand, to



pedagogical and psychological problems; On the other hand, with the results achieved in such scientific and technical areas as telecommunication technologies and networks; Computer systems for processing, visualizing information and interacting with humans; Artificial Intelligence; Automated systems for modeling complex processes; Automated decision-making systems, structural synthesis, and many others.

The problem of the widespread use of computer information technologies in the field of vocational education in the last decade is of great interest in the national pedagogical science. A great contribution to the solution of the problem of information technologies of education was made by Russian and foreign scientists: G.R. Gromov, V.I. Gritsenko, V.F. Sholokhovich, S. Peipert, G. Kleiman, B. Sendov, B. Hunter and others [1].

Various didactic problems of computerization and informatization of education are also reflected in the works of A.P. Ershova, A.A. Kuznetsova, T.A. Sergeeva, I.V. Robert; Methodical - B.S. Gershunsky, E.I. Mashbitsa, N.F. Talyzina; Psychological - V.V. Rubtsova, V.V. Tikhomirova et al. [1].

The importance of understanding the need for IT in education is also dictated by the fact that a modern higher school is faced with the task of training a specialist not only highly qualified, possessing scientific, technical knowledge and skills and professional skills, but also able to adapt quickly and independently in a changing information and technological environment; Possessing such professionally and socially significant qualities as initiative, creativity, mobility, enterprise, efficiency, and the quality of personality, aspiration for self-improvement and self-education. These qualities should be formed as a result of competently planned and organized work of students in the university. And in this context it is difficult to overestimate the importance and possibilities of applying IT in a university.

The purpose of the study is to analyze the use of information technologies for effective student education and to identify the place of IT in the educational process of a higher educational institution.

The main text. In the process of teaching students, teachers of higher education



increasingly use more and more, especially in recent times, information technology. Basically, they create educational and methodical complexes based on information and computer technologies, which often include:

- e-learning tool;
- bank of test tasks for automated control of students' knowledge;
- electronic lecture summary (ECL) of the teacher;
- methodical support for the use of mathematical packages for engineering calculations (in the study of exact disciplines).

One of the advantages of using information computer technologies (ICT) is a visual and imaginative representation of information. This didactic principle is fully realized in the electronic hyperlink training manual, usually including:

- theoretical block, structured by sections;
- self-control unit (exercises, tests, questions);
- self-education unit.

In the manual it is expedient to implement a multilevel construction of the material: the level of the beginner, the basic level, the level of in-depth study.

The first level of presentation of theoretical material corresponds to the knowledge of basic definitions, concepts.

The basic level should contain the whole base course and be accompanied by live graphics and illustrations, computer animations, movie clips, etc., which facilitate the assimilation of the material. Animated schemes and drawings, run by the learner himself, explain the most difficult sections of the course.

At the level of in-depth study, questions that are not included in the main course, the history of the development of the studied science in personalities, etc. are added to the main course.

All sections of the training manual should be accompanied by test cases, tasks for independent decision with the ability to immediately check the result and allow the student to assess the degree of mastering the theoretical material.

One of the modern means of teaching is also the electronic abstract of lectures (ECL), intended for the lecturer and used by him, taking into account his individual



manner of lecturing, the level of preparedness of students, etc. The electronic abstract of lectures combines slides of text and graphic accompaniment (diagrams, drawings, etc.) with computer animation and numerical modeling of the studied processes. When reading the lecture, photos, video clips, animation models, etc. imported from the Internet can also be used. It is necessary to emphasize that the use of ECL is only a kind of tool, a technical tool that makes it possible to achieve a high degree of visibility and imagery in explaining the "difficult" places to assimilate. In addition, the use of ECL in reading lectures should be strictly metered, otherwise negative consequences (rapid fatigue of students, increased eye strain, etc.) will exceed the possible positive effect.

The next direction of using ICT - teaching students the skills of using a personal computer as a means of computer technology - is realized in the methodological support of using integrated mathematical packages (for example, MathCad, MathLAB).

Great difficulties in the practical implementation of this direction are caused, first of all, by the fact that students of the first courses do not study these packages. In addition, the number of classroom hours assigned to curricula for the study of exact disciplines is clearly not enough.

At the same time, when implementing the educational process of bachelors there are significant difficulties caused by a significant change in the ratio of hours of classroom and independent work toward increasing hours allocated for independent work of students (CDS).

For the effectiveness of the CDS, it is necessary to fulfill a number of conditions, such as a rational combination of the amount of classroom and independent work, providing the student with the necessary methodological and information materials, monitoring the organization and progress of the CDS, and the availability of measures that encourage the student for its high-quality implementation.

An important factor that ensures the normal and effective functioning of the student's independent work is the presence of continuous monitoring and evaluation of its results on the part of teachers. In this regard, the absence of hours assigned to



the teacher for individual consultations (due to their exclusion from the curriculum) causes insurmountable difficulties for students, especially the junior courses.

Thus, the process of organizing, implementing and monitoring the CDS using IT will be effective, i.e. Will contribute to the achievement of the educational standard, the independent solution of theoretical and practical problems in the field of training, to increase the activity of students' participation in the process of their own education, provided:

- forming students' readiness to apply IT in their educational and future professional activities;
- selection of information and educational technologies that are adequate to the plan and content of the CDS;
- determining the organizational and pedagogical conditions for the successful implementation of selected information and educational technologies in the CDS.

Compiled educational and methodical complexes based on information and computer technology must satisfy the basic principles of didactics.

The didactic principles are understood as the starting points underlying the selection of the content, organization and implementation of the learning process. These are the normative bases that are based on the well-known laws of the learning process and reflect the features of the organization of the teaching and learning processes, taking into account the psychology of the trainees.

At present, in the scientific literature covering the problems of informatization of higher education, it is possible to find different, sometimes mutually exclusive, interpretations of the didactic principles of the use of IT universities in the educational process [2]. Not aiming at the disclosure of all the views on this subject, it is nevertheless necessary to pay attention to the following fact. Absolute majority of researchers of this problem, as a rule, are on the way of creating a special system of principles reflecting the specifics of computer training or the development of particular principles for the use in the educational process of certain information tools. Evaluation of the existing approaches to this allows us to doubt the correctness of this direction, since already today there are more than one dozen such principles.



Moreover, in the overwhelming majority of cases, as the analysis shows, the declared principles are not essentially new, but only to a certain extent supplement, clarify, specify or develop the principles of traditional didactics, and in particular, programmed instruction. In general, this fact should be assessed as positive, but in the end this way can lead us to a dead end. After all, it is not possible for each newly created training facility to develop its principles, especially considering that in recent years their number has been increasing rapidly. From what has been said, we can conclude that at the present stage of the development of pedagogy in higher education, when determining the methodological requirements for application in the IT educational process, it should not be about replacing the traditional didactic principles with new ones, but about revising and filling them with such content that would allow them to be used constructively in the changed conditions.

Management of cognitive activity of trainees is an essential part of the didactic process. In many pedagogical monographs and dissertations sufficient attention is paid to the consideration of the features of this process. And in them it is proved that any educational activity is always manageable. These are either the direct control actions of a particular teacher, or the indirect effects of some "generalized" teacher (automatic control) with the help of various technical or computer tools, or self-management carried out by the learner in relation to himself.

The main disadvantages of traditional training in terms of the effectiveness of management of cognitive activity of trainees are:

Firstly, one management body (teacher) and many managed elements (trainees with different degrees of training, different abilities). Consequently, the teacher is faced with the need to manage equally qualitatively different objects of management, and, more simply, to focus on the nonexistent "average" trainee, and not on the specific person in the given audience.

Secondly, the feedback on the assimilation of educational information by the trained instructor is not constantly monitored, but only when tests, tests and inspections are carried out. The teacher does not know the degree of mastering the material by the trainees at any given time and therefore can not promptly adjust their



pedagogical influences. Feedback does not work consistently, and from time to time, with significant interruptions, the information comes in late and inadequate.

Thirdly, in such a complex, as is the activity of the teacher in the classroom (sometimes with just a few dozen students - lecture, group work), his freedom to "turn on" and "turn off" at his discretion the channels of direct and feedback is severely limited. The teacher can pay attention to one student only at the expense of others.

Fourth, the teacher is limited to a large extent in the ability to support students in a state of constant active cognitive activity. Training is a two-way process, and if one side is passive, then the effectiveness of training is significantly reduced.

These shortcomings can be largely eliminated by using IT. The fulfillment of the functions of management of educational activity in it should be considered as an essential sign of the use of the computer as a learning tool. When we talk about IT education, we have in mind primarily the use of computers as a means of managing educational activities.

For the effective management of the learning process, it is necessary to create an adaptive model of the teacher's actions that explicitly takes into account the goals, methods, results of training and which solves two main tasks: the task of diagnosing the psychological state and level of the student's knowledge and the task of managing his cognitive activity. The essence of the first task is to recognize the current psychological state and level of knowledge of trainees. The essence of the second task in the planning and implementation of the optimal sequence of actions, ensuring the assimilation of the necessary knowledge for a minimum time or the maximum amount of knowledge for a given time.

It must be constantly remembered that "to govern is not to suppress, not to impose a process that is contrary to its nature, but, on the contrary, to take into account the nature of the process as much as possible, to coordinate each impact on the process with its logic" [3].

Consider the negative side of the use of modern information technology in terms of psychology.



It should be noted that the use of computers in all spheres of human activity raises new problems. There are the following psychological phenomena associated with human development of new information technologies:

- personalization, "animation" of the computer, when the computer is perceived as a living organism;
 - the need for "communication" with the computer and the specifics of such communication;
 - various forms of computer anxiety;
 - intrusion into the inner world of a person, leading to the emergence of an existential crisis for some users, accompanied by cognitive and emotional disabilities.
- At the same time, there may be a reassessment of values, a revision of views on the universe and its place in the world.

One of the negative aspects of informatization is the appearance of computer anxiety in some people (and not only users). At present, there is no clear definition, this concept, and there are no universally accepted methods of prevention and treatment of computer anxiety. Most psychologists mean under it the fear arising when working on a computer or thinking about it. It is established that the level of computer anxiety can predict the success of learning to work on the computer. G.Markulides showed that the presence of computer anxiety significantly reduces computer literacy and interest in working on a computer. People who are experiencing high anxiety when performing any task on a computer tend to have a negative attitude towards the computer. On the other hand, as pointed out by D. Campbell and C. Perry, negative emotions in some cases can stimulate the growth of activity, the desire to perform the task as best as possible and thus lead to an increase in the success of activity [2].

Students and students have computer anxiety often as a reaction to fear of getting a bad mark, seem incapable or stupid compared to other learners.

One of the types of computer anxiety is "computer stress". In the work of A.M. Bokovikova [2] studies the stress associated with the computerization of professional activity, determines the stress-resistance factors in the process of adapting a person to



work on a computer. The main stressor factor when working on a computer, he believes the loss of control over the activities when the situation of interaction with the computer goes out of control. Stress-resistance is determined primarily by personality traits. At the same time, activity, initiative, self-confidence, emotional stability and an optimistic assessment of the situation are the basis for resistance to stress.

Among the negative consequences of the long-term use of information technology, autism is also allocated (avoiding reality, the dependence syndrome on the computer and especially on the Internet).

Summary and Conclusions. One of the important factors for improving the system of training professional personnel in higher education is the active use in the educational process of modern IT. Information and computer technologies give the learning process a more effective, attractive and stimulating training. Despite the presence of serious research in this field, the need to further develop its theory and methodology is still very acute. In recent years, progress has been made in the development of pedagogical technologies that are adequate to the goals, content and methods of intensive education, resulting in a large variety of promising IT education in universities that allow solving effectively many of the didactic problems that exist today in higher education in the training of highly qualified professionals.

However, the psychological aspects of the introduction of information technologies in education have been relatively poorly studied. At present, the pace of improving IT education is ahead of the processes of psychological and pedagogical understanding and research.

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Аннотация.

В работе рассматривается использование информационных компьютерных технологий для эффективного обучения студентов. Проанализированы положительные и отрицательные стороны использования современных информационных технологий с точки зрения психологии.

Ключевые слова: информационные технологии, электронное учебное пособие, самостоятельная работа студентов, дидактические принципы, компьютерная тревожность.

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Article sent: 31/03/2017 of

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**j12-031****DOI: 10.21893/2227-6920.2017-12.031**

**FORMATION AND DEVELOPMENT OF METHODS OF TEACHING
UKRAINIAN LANGUAGE (FOR PROFESSIONAL PURPOSES):
HISTORIOGRAPHY OF A QUESTION
СТАНОВЛЕННЯ І РОЗВИТОК МЕТОДИКИ НАВЧАННЯ
УКРАЇНСЬКОЇ МОВИ (ЗА ПРОФЕСІЙНИМ СПРЯМУВАННЯМ):
ІСТОРИОГРАФІЯ ПИТАННЯ**

c.t.s., as. prof. Gumeniuk I.M. / к.ф.н., доц. Гуменюк І.М.*ORCID: 0000-0002-0790-6732**Vasyl Stefanyk Precarpathian National University,**Ivano-Frankivsk, Shevchenka 57, 76018**ДВНЗ „Прикарпатський національний університет імені Василя Стефаника”,**Івано-Франківськ, вул. Шевченка, 57, 76018*

Abstract. The article is devoted to the historiographical aspects of the problem of development of the methods of teaching Ukrainian language (for professional purposes) – a new sphere of Ukrainian linguodidactics, which is developing by its laws and has its own peculiarities, as it is closely linked with professional pedagogics. On the basis of analysis and generalization of existent scientific works in this direction there were completed their systematization and statistic processing by the spheres of purpose. There was substantiated the necessity of research of the problem of formation and development of the methods of teaching Ukrainian language (for professional purposes), elaboration of an only scientific and methodical system of teaching this discipline in the higher pedagogical educational institutions.

Key words: methods of teaching Ukrainian language (for professional purposes), professional competences, professional speech, speech personality, motivational component of education.

Introduction.

Cardinal transformations, which are happening in education in connection with integration of Ukraine into the European educational space, are essentially



influencing on strategy and tactics of development of the high school. First of all, this concerns preparing of a future teacher. In modern conditions from the teacher are required not only perfect possession of theoretical material and algorithm of its presentation, but also the whole complex of professional competences, which correspond to the requirements of a young generation, namely: ability to scientific and search activity, innovative activity, to independence and substandard decisions, creative thinking, terminological, informational and technological awareness, self-education, organizing of contacts with members of professional activity, general scientific, documentary, speech and communicative competence etc.

In this context becomes actual a question of determination of conceptual bases and linguodidactic preconditions of formation of modern methods of teaching Ukrainian language (for professional purposes) as a universal course, which is directed at formation of basic and professional competences of the students of higher pedagogical educational institutions of Ukraine.

The main text.

Chronological limits of the research outline themselves by the date of appearance of a new educational discipline "Ukrainian Language (for Professional Purposes)" and contemporaneity. The course was introduced according to the resolution of the Cabinet of Ministers №998 from 08.09.1997, where were ratified "Complex Measures Regarding to All-Round Development and Functioning of Ukrainian Language" instead of a discipline "Business Ukrainian Language". The title of the new course was obliging to enrich the content of the educational discipline without limiting it only by business speech and direct the students at learning of professional speech depending on a profile of educational institution. Today "Ukrainian Language (for Professional Purposes)" is an only discipline, which is being studied by students of younger courses of all specialities.

Introducing of the new educational discipline caused a wide resonance in pedagogical community. In scientific and methodical magazines appeared considerable number of publications, themes of which touched the specificity of teaching Ukrainian language (for professional purposes). These scientific



investigations may be grouped by several directions:

1) general researches (M. Lisovyi, L. Tyshchenko "Ways of Optimization of Educational Process During Studying a Course "Ukrainian Language (for Professional Purposes)"; N. Yuriychuk "A Role of Ukrainian Language (for Professional Purposes) in Professional Formation of the Students of Higher Educational Institutions"; O. Melnychuk, L. Silevych "Methodical Aspects of Learning the Ukrainian Language (for Professional Purposes)"; L. Holovata, L. Kostiuk "Importance of a Discipline "Ukrainian Language (for Professional Purposes)" in a Process of Preparation of a History Expert"; N. Lehkodukh "Development of a Speech Personality in Studying a Discipline "Ukrainian Language (for Professional Purposes)"; O. Antonchuk "A Question of Language Culture in Textbooks of a Discipline "Ukrainian Language (for Professional Purposes)" and others;

2) researches of separate technologies and approaches of teaching (O. Tieliezhkina "Appliance of Design Technology at the Lessons of Ukrainian Language (for Professional Purposes) at the Higher Educational Institutions"; O. Melnychuk, L. Silevych "Usage of Innovative Personally-Oriented Pedagogical Technologies During Studying the Ukrainian Language (for Professional Purposes)"; I. Romanova "Multimedia Presentation as a Mean of Increasing of Effectiveness of Teaching Ukrainian Language (for Professional Purposes)"; O. Hrydzhuk "Usage of Interactive Methods of Education in Teaching Discipline "Ukrainian Language (for Professional Purposes)" and others;

3) conceptual researches (S. Doroshenko "For a New Educational Discipline – a New Conception"; V. Dubichynskyi, L. Vasylenko, O. Bondarets "A Conception of Teaching Discipline "Ukrainian Language (for Professional Purposes)"; O. Tyshchenko „A Model of a Course "Ukrainian Language (for Professional Purposes)";

4) linguodidactic researches (H. Horokh "Phraseological Peculiarities of Business Speech"; H. Lukash "To a Question about Linguistic Basis of Educational Discipline "Ukrainian Language (for Professional Purposes)"; O. Starova, T. Panova



”Standard Linguistic Mistakes and Organization of Work for Their Correction During Teaching Discipline ”Ukrainian Language (for Professional Purposes)””; L. Melnyk, T. Markotenko ”Phraseologisms as a Component of Professional Speech of Future Teachers of the Primary School”; A. Yevhrafova ”Theoretical Concepts of Modern Linguistics in the Context of a Discipline ”Ukrainian Language (for Professional Purposes)””; Z. Sikorska ”The Verb in a Sphere of Professional Speech” and others;

5) special researches (N. Totska ”Formation of Professional Conditioned Speech of the Technical University Students”; T. Loboda ”Conditions of Effective Teaching Course ”Ukrainian Language (for Professional Purposes)” at Non-Filological Faculties of Pedagogical University”; A. Savina ”Peculiarities of Teaching Students of Juridical Profile the Business Writing Skills”; V. Rohozina ”Formation of the Culture of Scientific Written Speech in the Students of Chemistry”; T. Martsinko, I. Moskalenko ”Elements of Oratorical Art in a Format of Lessons from Course ”Ukrainian Language (for Professional Purposes)” for Students-Agrarians”; L. Shlieyina ”Development of Educational Independence of Future Ekonomists in a Process of Studying a Discipline ”Ukrainian Language (for Professional Purposes)””; N. Chaban ”Formation of Civil Position in Future Culturologists at the Lessons of Ukrainian Language (for Professional Purposes)””; N. Kostrytsia ”Formation of Communicative Competence of the Students-Agrarians”; N. Solodiuk ”Organization of Interactive Education at the Lessons of Ukrainian Language (for Professional Purposes) of the Medical Students” and others.

As we see, mentioned researches have fragmentary nature, touch different aspects and don't analyze thoroughly theoretical and methodological bases of teaching this discipline, ways to their practical realization. Besides that, among existent researches very insignificant part ($\approx 10\%$) is formed by works, which are devoted to consideration of specificity of teaching Ukrainian Language (for Professional Purposes) to the students of higher medical and agrarian institutions.

So, analysis of scientific sources tells us that in modern pedagogical science exist objective preconditions for research of the problem of formation and development of the methods of teaching Ukrainian Language (for Professional



Purposes), elaboration of the only scientific and methodical system of teaching this discipline in higher pedagogical educational institutions.

Summary and Conclusions.

The main intention of the course "Ukrainian Language (for Professional Purposes)" is effective formation of the students' professional speech, development of speech personality for usage of acquired knowledge in professional activity. As noticed O. Tyshchenko, the success of professional communication depends on personal qualities of speaker, his/her speech competence and communicative skills [1]. The difference between aspects of the components of professional speech requires consideration of psychological, pedagogical and linguodidactic preconditions in the process of teaching Ukrainian Language (for Professional Purposes), introduction of innovative technologies, elaboration of modern, creative, professionally directed forms of independent work, which would provide students with motivational component of education, encourage them to scientific and search activity, give them a stimulus to development and self-perfection.

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Анотація

Стаття присвячена дослідженню історіографічних аспектів проблеми становлення і розвитку методики навчання української мови (за професійним спрямуванням) – молодій галузі української лінгводидактики, що розвивається за її законами й має власні особливості, оскільки тісно пов'язана з професійною педагогікою. Названий курс – універсальний для формування базових і професійних компетентностей студентів усіх спеціальностей, що є особливо актуальним в умовах інтеграції України в Європейський освітній простір. На основі аналізу та узагальнення наявних наукових напрацювань у цьому напрямі здійснено їх систематизацію і статистичну обробку за сферами призначення. Обґрунтовано необхідність дослідження проблеми становлення й розвитку методики викладання української мови (за професійним спрямуванням), розроблення єдиної науково-методичної системи викладання цієї дисципліни у вищих педагогічних навчальних закладах.

Ключові слова: *методика навчання української мови (за професійним спрямуванням), професійні компетентності, професійне мовлення, мовна особистість, мотиваційний*



компонент навчання.

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Article sent: 28/03/2017 of
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**j12-055****DOI: 10.21893/2227-6920.2017-12.055**

**ADMINISTRATIVE ASPECTS OF THE MANAGER'S OF PRESCHOOL
EDUCATIONAL INSTITUTION ACTIVITIES IN EDUCATIONAL FIELD
OF "KNOWLEDGE"**

**УПРАВЛЕНЧЕСКИЕ АСПЕКТЫ ДЕЯТЕЛЬНОСТИ РУКОВОДИТЕЛЯ
ДОУ В РЕАЛИЗАЦИИ ОБРАЗОВАТЕЛЬНОЙ ОБЛАСТИ
«ПОЗНАВАТЕЛЬНОЕ РАЗВИТИЕ»**

к.р.с., as.prof. Poklonskaya V.D. / к.п.н., доц. Поклонская В.Д.

Head of MBDOU kindergarten № 51 "Golden nut" in Pyatigorsk

Пятигорский государственный университет Пятигорск, пр.Калинина,9. 357500

Morozova O.V. / Морозова О.В.

Head of MBDOU kindergarten № 51 "Golden nut" in Pyatigorsk

Заведующий МБДОУ детский сад №51 «Золотой орешек» г. Пятигорска

Annotation. This article presents the features of the practical managerial activity of the head of the pre-school educational institution (PEI) in the context of the organization of the education and educational process. Psychological and pedagogical conditions for the provision of the educational program of the PEI are considered. The experience of realization of problems of cognitive-speech development of preschool children is presented.

Keywords: federal state educational standard, pre-school educational institution, management problems, cognitive-speech development.

The federal state educational standard of preschool education determines the requirements for the structure, conditions and results of mastering the basic educational programs. This document includes, among other things, the task of "... ensuring the variability and diversity of the content of the Program and the organizational forms of preschool education, the possibility of forming programs of different focus, taking into account the educational needs, abilities and health status of children ..." [2, p.4]. The effectiveness of the implementation of the tasks presented in this document confronts of the manager a number of problems that



determine the content of the activities of the PEI teachers to ensure the institution's development regime. One of them is the creation of psychological and pedagogical conditions for the implementation of educational areas in accordance with FSES PE.

In the opinion of V.A. Tranev, "the chief role in managerial activity belongs to the head (manager). The manager ... forms strategic goals and defines tasks aimed at achieving these goals "[4, pp.36-37]. PI Tretyakov and K.Y. Belaya believes that the management system for achieving optimal results includes the following areas of the manager's activities: "information-analytical, motivational-target, planned-prognostic, organizational-performing, control-diagnostic, regulatory-corrective" [5, p.69-70]. Alabastrova A.A. refers to the indicators of management of the development of the preschool education system assessment of "... 1) the organizational and pedagogical activities of the head; 2) management functions (analysis, control) "[1, p.11].

An important indicator of the PEI's work is the parents' satisfaction with the activities of the administration and the collective as a whole. The efficiency of cooperation with the family depends on the parents' awareness of the specifics of the basic and partial programs implemented in the pre-school educational institution, additional services. It is very important to "ensure the productive interaction of the pre-school educational institution with the family" [3, p.41]. "Today it is quite obvious that ... it is necessary to unite the work of teachers and parents. But for this association to take place, it is necessary to take into account the specifics of working with parents. First of all, it is necessary to conduct a pedagogical analysis of the activities of teachers ... "[1, p.58].

The basis of management of the Kindergarten No. 51 "Golden Walnut" in Pyatigorsk is prognostication, psychological and pedagogical design, ensuring a positive psychological climate in the institution, monitoring the quality of educational and educational work. Careful study of the results of the educational and educational process determines the planning of the PEI activities, taking into account the pedagogical analysis of the previous work, makes it possible to ensure a positive end result of the activities of the teaching staff. Among the important directions of the DOW work is the realization of the cognitive-speech development of children of



preschool age.

We were considered, that the implementation of the goals and objectives of the basic educational program in the Kindergarten No. 51 "Golden Walnut" in Pyatigorsk is purposefully conducted according to the exemplary program "From birth to school", ed. by N.E. Veraksy, T.S. Komarova, M.A. Vasilieva.

The following psycho-pedagogical conditions are ensured in the PEI:

- realization of the personality-oriented model of interaction of all participants in the educational process;
- implementation of an integrated approach to the development of pupils, taking into account age features;
- creation of conditions for raising the professional skills of teaching staff on the problem of "cognitive-speech development of preschool children" using modern pedagogical technologies;
- construction of a developing object-spatial environment in accordance with the requirements of FSES PE;
- cooperation with families of pupils in order to realize the full development of each child.

Cognitive tasks are solved in the course of organized, joint activities with preschool children, as well as games and experiments of children with sand, clay, snow, water, dough, cereals, etc. Observation of such phenomena as melting snow, ice, freezing, boiling, evaporation and condensation of water allows us to strengthen the ability of children to establish cause-effect relationships, develop curiosity and activity. The activity of preschool children in clubs ("Merry Alphabet", "Playful", etc.) contributes to the development of sensory-motor skills, the formation of the cognitive sphere of preschool children.

Conducting open classes, workshops ("Integrated employment as a means of developing preschool children"), consultations ("Event organization of educational activities in pre-school educational organizations", "Usage of gaming technology in the development of speech with children of preschool age"), development of recommendations ("Conducting monitoring of the quality of mastering the basic



educational program") ensure the improvement of pedagogical skills, determine the creative search for the collective. The work of the city innovative site on the problem of "New forms of interaction between the DOU and the family" on the basis of a preschool institution demonstrates innovative forms of interaction with the family, helps enrich the parents' ideas about the developmental features of preschool children.

The result of the activity of the PEI team is the following achievements: All-Russian Olympiad for teachers "Institute for the Development of Pedagogical Excellence", online Olympiad: "Professional competencies of pedagogical workers in pre-school education" - 1 place; All-Russian online Olympiad "PedStart" for teachers - nomination: "Requirements of FES for the system of preschool education" - 1st and 2nd place; All-Russian creative Internet contest "The Wise Men" - nomination: "Creative works and methodical development of teachers" - 3rd place, etc.

Thus, the construction of an educational and educational process, taking into account the conceptual provisions of the FES PE, the scientific principles of planning in the activity of the head of preschool educational institutions, the creation of psychological and pedagogical conditions in the implementation of the tasks of cognitive-speech development of pupils, optimize the development of the personality of preschool children.

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Аннотация.

В данной статье представлены особенности практической управленческой деятельности руководителя дошкольного образовательного учреждения в контексте организации воспитательно-образовательного процесса. Рассматриваются психолого-педагогические условия обеспечения образовательной программы ДООУ. Представлен опыт реализации задач познавательно-речевого развития дошкольников.

Ключевые слова: федеральный государственный образовательный стандарт, дошкольное образовательное учреждение, проблемы управления, познавательно-речевое развитие.

Федеральный государственный образовательный стандарт дошкольного образования определяет требования к структуре, условиям и результатам освоения основных образовательных программ. Данный документ включает, в том числе, задачу «...обеспечения вариативности и разнообразия содержания Программ и организационных форм дошкольного образования, возможности формирования Программ различной направленности с учетом образовательных потребностей, способностей и состояния здоровья детей...» [2,с.4]. Эффективность реализации представленных в данном документе задач ставит перед руководителем ряд проблем, которые определяют содержание деятельности педагогов ДООУ для обеспечения режима развития учреждения. Одной из них является создание психолого-педагогических условий по реализации образовательных областей в соответствии с ФГОС ДО.

По мнению В.А.Трайнева, «главная роль в управленческой деятельности принадлежит руководителю (менеджеру). Менеджер...формирует стратегические цели и определяет задачи, направленные на достижение этих целей» [4,с.36-37]. П.И.Третьяков и К.Ю. Белая считают, что система управления достижения оптимальных результатов включает следующие направления деятельности руководителя: «информационно-аналитическое, мотивационно-целевое, плано-прогностическое, организационно-исполнительское, контрольно-диагностическое, регуляторно-коррекционное» [5,с.69-70]. Алебастрова А.А. относит к показателям управления развитием системы дошкольного образования оценку «...1) организационно-педагогической деятельности руководителя; 2) управленческих функций (анализ, контроль)» [1, с.11].

Важным показателем работы ДООУ выступает удовлетворенность родителей деятельностью администрации и коллектива в целом. От информированности родителей о специфике реализуемых в дошкольном образовательном учреждении основных и парциальных программ, дополнительных услуг, зависит эффективность сотрудничества с семьей. Весьма актуально «обеспечение продуктивного взаимодействия дошкольного образовательного учреждения с семьей» [3, с.41]. «Сегодня совершенно очевидно, что...необходимо объединение работы педагогов и родителей. Но чтобы это объединение произошло, необходимо учитывать особенности работы с родителями. Прежде всего, следует провести педагогический анализ деятельности педагогов...» [1, с.58].

Основой управления МБДООУ детский сад № 51 «Золотой орешек» г. Пятигорска выступает прогнозирование, психолого-педагогическое проектирование, обеспечение положительного психологического климата в учреждении, проведение мониторинга качества воспитательно-образовательной работы. Тщательное изучение результатов воспитательно-образовательного процесса определяет планирование деятельности ДООУ с учетом педагогического анализа предшествующей работы, позволяет



обеспечить положительный конечный результат деятельности педагогического коллектива. Среди важных направлений работы ДООУ является осуществление познавательно-речевого развития детей дошкольного возраста.

Осуществление целей и задач основной образовательной программы в МБДООУ детский сад № 51 «Золотой орешек» г. Пятигорска целенаправленно проводится соответствии с примерной программой «От рождения до школы» под ред. Н. Е. Вераксы, Т. С. Комаровой, М. А. Васильевой.

В ДООУ обеспечиваются следующие психолого-педагогические условия:

- реализация личностно-ориентированной модели взаимодействия всех участников воспитательно-образовательного процесса;
- осуществление интегрированного подхода в развитии воспитанников с учетом возрастных особенностей;
- создание условий для повышения профессионального мастерства педагогических кадров по проблеме «познавательно-речевое развитие дошкольников» с использованием современных педагогических технологий;
- построение развивающей предметно-пространственной среды в соответствии с требованиями ФГОС ДО;
- сотрудничество с семьями воспитанников в целях осуществления полноценного развития каждого ребенка.

Познавательные задачи решаются в ходе организованной, совместной деятельности с дошкольниками, а также игр и экспериментов детей с песком, глиной, снегом, водой, тестом, крупой и др. Наблюдение за такими явлениями, как таяние снега, льда, замерзание, кипение, испарение и конденсация воды позволяют закрепить умения детей устанавливать причинно-следственные связи, развивают любознательность и активность. Деятельность дошкольников в кружках («Веселая азбука», «Игралочка» и др.) способствует развитию сенсорно-моторных навыков, формированию познавательной сферы дошкольников.

Проведение открытых занятий, семинаров-практикумов («Интегрированное занятие как средство развития дошкольников»), консультаций («Событийная организация образовательной деятельности в дошкольной образовательной организации», «Использование игровых технологий в работе по развитию речи с детьми дошкольного возраста»), разработка рекомендаций («Проведение мониторинга качества освоения Основной образовательной программы») обеспечивают совершенствование педагогического мастерства, определяют творческий поиск коллектива. Работа городской инновационной площадки по проблеме «Новые формы взаимодействия ДООУ и семьи» на базе дошкольного учреждения демонстрирует инновационные формы взаимодействия с семьей, способствует обогащению представлений родителей об особенностях развития детей дошкольного возраста.

Результатом деятельности коллектива ДООУ являются следующие достижения: Всероссийская олимпиада для педагогов «Институт развития педагогического мастерства», онлайн-олимпиада: «Профессиональные компетенции педагогических работников дошкольного образования» - 1 место; Всероссийская онлайн-олимпиада «ПедСтарт» для педагогов - номинация: «Требования ФГОС к системе дошкольного образования» - 1-е и 2-е место; Всероссийский творческий интернет-конкурс «Рассударики» - номинация: «Творческие работы и методические разработки педагогов» - 3-е место и др.

Таким образом, построение воспитательно-образовательного процесса с учетом концептуальных положений ФГОС ДО, научных принципов планирования в деятельности руководителя дошкольного образовательного учреждения, создание психолого-педагогических условий в реализации задач познавательно-речевого развития воспитанников, оптимизируют процесс развития личности детей дошкольного возраста.

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j12-011

DOI: 10.21893/2227-6920.2017-12.011

**FEATURES OF METHODOLOGICAL SUPPORT FOR TUTOR'S ACTIVITIES
IN MODERN DISTANCE EDUCATION
ОСОБЕННОСТИ МЕТОДИЧЕСКОГО ОБЕСПЕЧЕНИЯ
ТЮТОРСКОЙ ДЕЯТЕЛЬНОСТИ В СИСТЕМЕ ДИСТАНЦИОННОГО
ОБРАЗОВАНИЯ**

с. ped.s., as.prof. Zhovtonizhko I.N. / к.пед.н., доц. Жовтוניжко И.Н.

ORCID: 0000-0000-0000-0000

с.ph-m.s, as.prof. Kaydash M.V. / к.ф-м.н., доц. Кайдаш М.В.

ORCID: 0000-0000-0000-0000

National University of Pharmacy, Kharkov, st. Pushkinskaya 53, 61002

Национальный фармацевтический университет, Харьков, ул. Пушкинская 53, 61002

Abstract. The article is devoted to an actual problem of tutor's activities usage in modern distance education as an innovative component of the educational process. On the basis of scientific and educational literature the essence of the concept of a tutor has been disclosed. The authors suggest to divide the main components of methodological support of tutor's activities technology into several groups: normative & organizational group, instructional & methodical group, educational & resource group.

Key words: tutor, tutor's activities, methodical support, distance education, higher school.

Introduction. In the context of the implementation of the educational standards of the higher school the priorities in the activities of academic staff are constantly changing. For frequent, high school teacher becomes a conductor of the global world of knowledge and modern higher education institution is focused on the social state demand and is building its education system so as to allow every citizen to learn continuously, constantly improving skills level. In these circumstances, the position of a tutor is based on the principles of individualization and openness of education and is also linked to the idea of responsibility of a student for himself. In addition, tutoring as a resource for the development of university education has significant



prospects in a variety of directions: from supporting an individual educational program to distance learning. Therefore, the problem of tutor's activities usage in distance education is of particular relevance nowadays.

Main text. Features of tutor's activities in distance education have been considered in the scientific and educational researches by A. Teslinov, V. Kuharenko, A. Chernyavskaya, E. Komhakov, L. Bendova, N. Zhevakina, O. Andreev, A. Ishkov, O. Popovich, ect. However, there is no separate investigation, which would be fully illuminated the problem of development and implementation of scientific and methodological support for tutor's activities.

In modern scientific and pedagogical literature, there are different approaches to define term "tutor" in the system of distance education. In particular, Yu. Derazhne believes that the tutor is an essential component of distance learning, who serves as a teacher, counselor, mentor and methodologist [1, p. 5]. On S. Schennikov's opinion tutor is a teacher-consultant, «specialist in areas of organization of education and self-education. The tutor is responsible for conducting holistic educational module as well as organization of group and individual work with students. The main tutor's tasks include methodical preparation and carrying out of group sessions, workshops; assistance in carrying out certification work, their inspection and evaluation; consultation and other forms of psychological and pedagogical support to students; individual assistance in dealing with academic or personal problems related to education; vocational guidance and career counseling. Actual tutor's roles are didactic, organizational, marketing, consulting, leadership» [4, p. 488].

We believe that the tutor is a teacher-mentor, who is capable of providing social and pedagogical support for students when they select and take their individual educational trajectories; the one who helps students with distance education issues. Tutor is more an assistant teacher than an actual teacher, a mediator between the lecturer and a student, performing rather organizational than the pedagogical function. In addition, the tutor is a key figure, may not necessarily be the developer of the academic course, but only performs the role of a motivator for a student regarding his successful training activities.



Based on the analysis of scientific and educational research and our own experience, we note that the tutor in distance education must meet the following requirements: to provide students with all the necessary educational materials, to consult students on additional issues; to identify individual characteristics and interests of each student, as well as to consider the characteristics during the preparation of curriculum and test tasks for him; to possess deep knowledge in the subject area and have good professional skills to transfer tutor's knowledge and skills to students; to organize high-quality group conferences and act as moderator and coordinator during the discussions; to ensure the relationship between the theoretical studies and practical activities for students; to have skills at information media and social networks.

Undoubtedly, the introduction tutor's activities involves the usage of the system of ideas, methods, techniques and programs taking into account the concrete psychological and pedagogical conditions. Moreover, innovative processes in modern education system indicate the qualitative stage of interaction and development of individual and pedagogical creativity, which in turn, can not be implemented without the development of methodical support and guidance systems for the cognition and management of innovative educational processes in the appropriate direction.

Let us consider the basic components of methodological support for tutor's activities. Scientific and methodological support of educational process includes:

- state component (state educational standards, curriculum and regulatory programs for all academic disciplines, textbooks and teaching aids with the stamp of MES of Ukraine);
- the component, developed by a higher school or university (curricula and programs; training programs on selected academic disciplines, training and educational aids without the stamp of MES of Ukraine; educational materials for seminars, practical and laboratory classes, individual tasks for independent work, control tasks for seminars and practical classes, test papers to check the level of students' knowledge, etc.) [3].

Thus, a teacher who uses tutorial technologies in his pedagogical activity should



develop a set of documents of a methodical direction on the basis of the relevant components. Such a package must contain:

1. Normative and organizational support represents educational and methodical documentation, which regulates tutor's activities (curriculum, schedule of individual and group counseling).

2. Instructional and methodological support represents explanatory and instructional documentation, providing an effective involvement of students into learning process assured by tutor's support (forums, chats, tutorials, etc.); teaching aids for students on the implementation of different types of learning and cognitive activities (testing, essay writing, project work, etc.).

3. Training and resource support represents printed, electronic and software resources provided to use in teaching presses directly (printed and electronic aids, lecture materials, presentations). [2]

Moreover, to the main components of training and methodological support one should include the following: guidelines to the study modules; multimedia lecture demonstrations, hypertexts of lectures and hypermedia, basic notes; electronic workshop to develop skills of applying theoretical knowledge with examples of assignments; laboratory workshop with interactive animations; interactive multimedia materials for business games and solving situational tasks; input, intermediate and final computer tests to control level of knowledge based on Flash animations; additional training and reference materials for independent work of students, etc.

Summary and Conclusions. Were received that tutor's activities in modern distance education are an innovative component of the education process, which provides the student entry into the educational space of a higher school. Therefore, methodological support, namely, its development and usage must be constructed in accordance with the consistent implementation by a tutor the analytical, forecasting and creative mental and practical activities as analysis, prediction and project are an inseparable triad of solving pedagogical problems, regardless of its subject and meaningful content.

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Введение. В работе рассматривается проблема использования тьюторской деятельности в системе дистанционного образования.

Основной текст. Тьютор является важнейшим компонентом дистанционного обучения, который выполняет множество функции от преподавателя до наставника. Используя основные составляющие методического обеспечения тьюторской деятельности, авторами выделен пакет документов, содержащий такие группы: организационное обеспечение, инструктивно-методическое обеспечение, учебно-ресурсное обеспечение.

Выводы. Методическое обеспечения является неотъемлемой частью тьюторской деятельности в системе дистанционного образования и должно строиться в соответствии с последовательным осуществлением аналитической, прогностической и проектировочной творческой умственно-практической деятельности.

Ключевые слова: тьютор, тьюторская деятельность, методическое обеспечение, дистанционное образование, высшее учебное заведение.

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**j12-040****DOI: 10.21893/2227-6920.2017-12.040****ALLUSIONS, SUBLIMINAL ADVERTISING AND MEMORY****IMPROVEMENT****АЛЛЮЗИИ, ПОДСОЗНАТЕЛЬНАЯ РЕКЛАМА И УЛУЧШЕНИЕ****ПАМЯТИ****Нисилевич А.Б., Стрижова Е.В.**

*Москва, Российский экономический университет имени Г.В. Плеханова, Стремянный
переулок, 36*

Moscow, Plekhanov Russian University of Economics, Stremyanny lane, 36

Abstract. This article is devoted to modern trends in application of allusions and subliminal messages both in business and education. The necessity of making quick choice, processing enormous amounts of information, memorizing numerous facts, calls for some new approach to well known problems. By affecting our mind we can achieve better results in different areas of human activity with less effort.

Key words: allusion, a wide variety of connotations, subliminal perception, subconscious stimuli messaging, pareidolia, conscious and subconscious, subvisual, embeds.

Introduction.

Subliminal perception is a deliberate process created by communication technicians, whereby you receive and respond to information and instructions without being aware of it. Messages in the form of printed words, pictures or voices presented either very rapidly or very obscurely bypass your conscious awareness. Anything consciously perceived can be evaluated, criticized, discussed, argued, and possibly rejected. In this article we are going to discuss the use of allusions and subliminal techniques in advertizing and contemplate the use of the method in education. We start with definitions.

The main text.

Allusions Defined. An allusion is a figure of speech that refers to a well-known story, event, person, or object in order to make a comparison in the readers' minds.



For instance, imagine a writer needs to explain her main character's struggle against an overwhelmingly powerful opponent. She wants to get across the idea that her character is righteous and stands a chance of winning the battle, even though that chance appears to be a remote one. She might refer to the confrontation as 'a meeting of David and Goliath.' The writer alludes to a well-known biblical story, the one of David and Goliath, to bring to readers' minds the idea that the confrontation will look like a one-sided battle but that the underdog stands a chance of triumph.

Some allusions are as obvious as the previous example, while others are more obscure. Because the story, event, person, or object being used in the allusion can carry a wide variety of connotations, allusions sometimes bring a wealth of information and attitudes with them. For instance, in the David versus Goliath example, not only does this allusion refer to an event in which one person has a clear advantage, but it also carries the idea that the person who deserves to win, and who will probably win, is the one with very little power.

Examples of Allusions. Sometimes allusion is easy to spot. A reference like 'That guy is a regular Adonis!' draws upon a mythical figure of beauty to make a comparison in an obvious way. But not all allusions are as easy to recognize. For instance, let's look at this line: 'My father carries the weight of the world.' This is an allusion to Atlas, a figure who held up the Earth in Greek mythology. Rather than refer to Atlas by name, this allusion calls up an image of Atlas by mentioning his most commonly recognized trait - the fact that he holds up the planet, and it carries connotations of enduring strength and nobility.

In *Moby Dick*, Herman Melville creates a sense of impending doom when he names the main ship the *Pequod*. Readers in Melville's time period would have been more familiar with the Pequot people, a Native American tribe who were driven to extinction. The ship's name then creates a feeling of imminent destruction through the use of this allusion.

Just think of all the mileage a character like Scrooge from *A Christmas Carol* has gotten! Any mention of Scrooge in the past 160 years immediately conjures the miserly old man in the Dickens novel and all the associations that come with him.



Calling someone a scrooge means more than simply calling someone stingy.

Subliminal advertising flashes words and images or text onto a screen faster than the conscious mind can read or decode them or, in printed advertisements, conceals such images and text by distorting them, surrounding them by meaningless squiggles and shapes, or placing them in unexpected locations. Nevertheless, the images and text are understood on an unconscious level and may affect the behavior of the audience who is subjected to such images or text.

Subliminal advertising, also known as subconscious stimuli messaging, is a form of advertising that uses subtle imagery, sounds, and content to attempt to influence the subconscious mind into making purchases or finding something to be appealing. While there has been much controversy over the years as to its actual use in advertising, subliminal marketing is something that society as a whole has gotten accustomed to due to the onslaught of television, print, publications and the Internet. Consumers have a tendency to become influenced easily by the addition of certain phrases, pictures, sounds, and stimuli that advertisers spend millions studying in trials before products even hit the shelves. This phenomenon can be called “the effect of allusion”.

The first acknowledged use of subliminal advertising was before the turn of the 20th century when barely noticeable visual and audio stimuli were introduced into marketing practices to influence consumers. The use of low levels of barely audible music or sounds combined with appealing visual images was shown to increase the likelihood of consumers feeling more comfortable and eventually making purchases. By the early to mid 1900s, subliminal advertising was being utilized by many major advertising firms to create a generation of loyal customers.

Here are some historical examples.

Coca-Cola's risqué artwork. A glistening Coke bottle surrounded by ice and sporting the tagline 'Feel the curves'... what could possibly be wrong with this image? Launched in the mid 80s in south Australia, the more suggestive elements of the image went unnoticed for a number of years. It was eventually spotted by a driver stuck behind a lorry sporting the ad. The driver noticed that one ice cube appeared to



hide the image of a woman performing a sex act. After its discovery, Coca-Cola, apparently oblivious to this visual allusion, promptly scrapped the advert and launched a complaint against the artist, who soon after lost his job.

KFC - all about the green. One would expect to see the late US president George Washington in many places, from statues, to town names, on the side of a mountain, and on a dollar bill, but not on a dollar bill sneakily placed within the lettuce of a chicken burger, which is where he was sighted in 2008 in a KFC ad. KFC **reportedly claims** the dollar bill was placed there as part of a contest, offering \$1 coupons to the first 1000 people who found the note, yet viewers were not even aware of a contest, so how could they enter? Conspiracy theorists assume that KFC wanted the viewer to associate a dollar bill with the a KFC Snacker burger - but it's all speculation.

The examples illustrate the tricky ground of using allusions in advertizing.

Subliminal advertising has, historically, occupied a legal grey area, not least because it's not clear when hidden messaging might be coincidence or simply 'pareidolia' (the phenomenon of the mind perceiving a familiar pattern where none actually exists).

But the murky marketing waters are not only populated by tinfoil-hat wearing conspiracy theorists, as some cunningly crafty marketers have indeed intentionally set out to influence their audience by hidden means.

The first reported subliminal ad was from 1947, spotted on a twirling sign urging viewers to buy war bonds in a Daffy Duck cartoon.

The effectiveness of subliminal advertising is still up for debate and it's been illegal in the UK, America and Australia since 1958.

Whether subliminal messages are even used in advertising or other media is a controversial question. Many believe it is a myth. While some willingly admit that subliminal marketing is used to produce greater sales, others claim that it is a bad practice that is frowned upon by the advertising industry. However, market research still shows that a good number of consumers recognize that subliminal advertising is an everyday part of the advertising world and that it does influence purchasing



decisions in a vast majority of consumer populations.

Since the method works, it can possibly find some other applications. Thus, subliminal messages are going more and more popular in key areas like memory improvement. Not only that, owing to their grand success people have started using them for a lot of other personal development training areas as well, like in work related personal development plans, personal development business and personal development growth!

How Subliminal Messaging Works. Our mind consists of two interacting parts: the conscious and subconscious. Our conscious mind gives us executive control of our mind. With consciousness, we can think, judge, feel and experience with awareness.

Popularized by Freud, the term “subconscious” refers to the part of our mind that operates below the level of conscious awareness. Think of it as a secret hiding place for our desires, motives and past experiences that exist outside of our conscious awareness.

What’s really fascinating is that our subconscious behavior is always on autopilot. Our subconsciousness is more powerful than consciousness when it comes to processing information: Subconsciousness is able to process 20,000 bits of information simultaneously, while consciousness can deal only with 7 ± 2 bits of information at the same time.

Modern science has discovered 37 known sensory inputs across seven broad categories: visual , auditory, tactile (touch), olfactory (taste), gustatory (smell), vestibular (balance and movement) and proprioception (body awareness). Among them, the visual category dominates our perception. To our knowledge, subliminal messages target two senses: visual and auditory. Under each category, there are several techniques.

Visual Subliminal Messages. There are two types of subliminal visual messages: subvisual and embeds.

Subvisual cues are flashed so quickly – usually a few milliseconds – that viewers don’t perceive them. In the classic James Vicary experiment, he flashed two



frames containing “Thirsty? Drink Coca Cola” and “Hungry? Eat Popcorn” into a film. It happened so quickly that film viewers were not able to detect them.

Embeds are usually static images embedded in an unchanging visual environment, hiding in our plain sight. They can often be seen in print advertisements, such as this dollar bill in a KFC’s burger ad.

Auditory Subliminal Messages. There are two types of auditory subliminal messages: subaudible and backmasking.

Subaudible messages are low-volume messages inserted into louder audio files so that they cannot be heard.

Backmasking is a video message recorded backwards so that the original message is disguised when playing it forward. It is often used in pop music, such as in The Beatle’s famously backmasked song “Number 9.” The phrase “number nine” was repeated over and over in the song, and when played backwards it became “turn me on dead man.”

Subliminal audio works by transmitting messages into your mind which are at a higher sound frequency. So even though you will not hear the subliminal statements and commands, they still enter your unconscious gradually and naturally. With time these messages build up and begin working to remove any psychological blockades you could have, and even any constraining beliefs, unfavorable self perceptions, and ineffective means of processing data.

In particular a memory improvement subliminal album will typically perform in a number of ways:

- To begin with it will start to wipe out any inefficiencies and blockages inside your mind which are blocking your capability to take in fresh information correctly. This basically means that you will be competent to more naturally and effectively process completely new information.

- Next it can develop the structure of your mind and the way your subconscious mind works to shift info around, stores it and is able to recall it. It will streamline all of your cognitive capabilities so that when you have learnt something new you will store it effectively and be able to remember it first time every time

If you struggle to remember people’s names, crucial dates, and precise details of various elements, subliminal messaging could be of use to you. Using subliminals



will clear your mind, enable you to take in facts, to store information, and remember it more effectively. SubliminalMP3 albums can be very useful in language learning.

Conclusion

After walking through the history of subliminal experiments, you can see that subliminal messaging isn't just black magic – there is science to it. And no matter how much we want to be in control of our reactions, we are subject to external influences—with and without us being aware of it.

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Стрижова Е.В., Нисилевич А.Б. В сборнике: ПРОБЛЕМЫ И ПЕРСПЕКТИВЫ РАЗВИТИЯ НАУКИ В РОССИИ И МИРЕ сборник статей международной научно-практической конференции: в 7 частях. 2016. С. 201-205.

Аннотация.

Данная статья посвящена современным тенденциям использования аллюзий и завуалированных сообщений, как в бизнесе (в области рекламы), так и в образовании. Реалии современного мира требуют предельной концентрации, запоминания огромных объемов информации и умения быстро принимать решения. Воздействуя на сознание, можно добиться впечатляющих результатов, в том числе значительно улучшить память.

Ключевые слова: аллюзии, широкий спектр коннотаций, подсознательное восприятие, сообщения о подсознательных стимулах, pareidolia, сознательные и подсознательные, субвизуальные, вложенные.

Article sent: 30/03/2017 of

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j12-063

DOI: 10.21893/2227-6920.2017-12.063

УДК 614.23

THE FORMATION OF PROFESSIONAL COMPETENCE OF A MEDICAL STUDENT

ФОРМУВАННЯ ПРОФЕСІЙНОЇ КОМПЕТЕНТНОСТІ СТУДЕНТА-МЕДИКА

Myronyk O. V., Davydenko O. M. /

Мироник О.В., Давиденко О.М.

Bukovinian State Medical University

Chernivtsi, Teatral'na Sq., 2, 58000

Вищий державний навчальний заклад України «Буковинський державний медичний університет»

Чернівці, Театральна площа, 2, 58000

Abstract. This paper analyzes aspects of formation of professional competence in medical students. Professional competence is an important criterion for the quality of training. And is based on the interaction osobistist values with professional qualities.

Key words. The medical student, expertise, professional quality.

Introduction.

Today the current transition from the traditional model of higher medical education, which were dominated by information and cumulative principles in osobistosti-oriented, which gives the opportunity to shape the future physician's ability to solve nonstandard professional tasks, creative thinking. Which in turn will allow to implement the principle – to treat the patient not the disease. The greatest importance of professional competence [5, 7, 10].

The main part.

The quality of training medical students in school depends on many factors. First, is the professionalism and motivation of the teaching work of teachers, conditions and provision of the educational process. Secondly, the motivation of the medical student, the ability to use modern technology learning. Thirdly, the



organization of teaching and research work of students as an integral part of the educational process, individual assignments, research projects with elements of scientific research work [1, 4, 6].

The attainment of professional competence requires the determination of professionally significant qualities of future specialists, finding-out of laws of his career by examining the impact of its activities, the interrelated studies of the personal and professional development. Professional development involves the growth, the formation of professionally important personal qualities and abilities, knowledge and skills, active qualitative transformation of the personality of his inner world, leading to fundamental restructuring and lifestyle, in particular self-actualization in the profession. Professional development is closely linked to personality, namely personality under the influence of the professional activities, ensuring the orientation of an individual towards self-improvement [2, 8, 9].

The present requires the future medics the ability to apply different types of activities: directly to the special, research, design, management, and others. During the training the student not only solves a typical job, but unexpected emergencies that encourage the search for new ways of action, instant response to an emergency. In the course of solving such problems and generates creative thinking specialist. Therefore, a specialist needs to emerge as a creative person even while training at a higher education institution.

Realization of creative potential of a medical student as a subject of professional activity ensures the formation of his professionalism from qualification to competence. Professional competence allows the future specialist to successfully perform various types of professional activity, it synthesizes a broad range of knowledge and practical skills, reflects the degree of formation of professional culture of the specialist and determines the results of his work. Professional competence is the measure and the main criterion of professional readiness and ability of medical students to perform tasks and duties in accordance with the chosen profession [7].

At the same time, professional competence is considered as an integrative



quality, the ability that can not be confined to a certain amount of knowledge, abilities and skills. Basically it involves such personal qualities, providing the ability to find and select the necessary knowledge, know how to act in a certain situation.

When organizing the educational process for medical students is important to maintain the principle of pedagogical cooperation in solving problems as a professional and osobistego formation. In the process of training needs to form common goals, objectives and understanding of their problems. The training is the exchange of values, experiences, and each party receives a certain step of development. Pedagogical interaction at different levels of the educational process, is the driving factor of formation of professional competence. In addition, the professional competence of a medical student includes a creative component, which is characterized by novelty in their professional activities, but can also manifest in personal and professional activities [3, 9, 11, 12].

A consequence of formed professional competence of the medical student, is the ability to work independently, generate goals of their professional activities, to focus on solving professionally-oriented problems using the latest technologies, to be able to cooperate fruitfully, plan and efficiently carry out their professional activities on the principles of mercy and tolerance, and the ability to objectively assess their professional activities from the point of view of efficiency.

Medical students should be stimulated to implement internal capacity in learning. The problem of qualitative training of experts should be implemented by the competence-based approach [3, 5].

Conclusions.

Therefore, professional competence is a criterion of the quality of education. And describes expert as a person that is able to solve professional problems and typical professional tasks that arise in real situations of professional activity with the use of acquired knowledge, experience, values and affection.

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Анотація. В роботі проаналізовано аспекти формування професійної компетенції у студентів-медиків. Професійна компетенція є важливим критерієм якості підготовки фахівців. І ґрунтується на взаємодії особистісних цінностей з професійними якостями.

Ключові слова. Студент-медик, компетенція, професійні якості.



j12-064

DOI: 10.21893/2227-6920.2017-12.064

**BASIC PRINCIPLES OF FORMATION AND DEVELOPMENT OF
COMPUTER SCIENCE TEACHERS' CREATIVE POTENCIAL
THROUGHOUT LIFE**

**БАЗОВІ ПРИНЦИПИ ФОРМУВАННЯ Й РОЗВИТКУ КРЕАТИВНОГО
ПОТЕНЦІАЛУ ВЧИТЕЛІВ ІНФОРМАТИКИ ПРОТЯГОМ ЖИТТЯ**

с.р.с., as. prof. Ovcharov S.M. / к.п.н., доц. Овчаров С.М.

*Poltava national pedagogical University named after V.G.Korolenko, Poltava, Ostrogradskogo 2,
36000*

*Полтавський національний педагогічний університет імені В.Г. Короленка, Полтава,
вул. Остроградського 2, 36000*

Abstract. The article is devoted to the problem of formation of teachers's creative potential, computer science teachers in particular, throughout their life. We have looked into authorial approaches to defining the concept of "creativity of a computer science teacher". We have also segregated the basic criteria by which it is advisable to assess the level of development of creativity of modern teachers. The essence and characteristics of each stage of the system of continuous professional education of computer science teachers have been analyzed.

Keywords: creativity of computer science teachers, continuous professional education of teachers.

Introduction

Creativity of modern teachers is caused by the peculiarities of their mental activity and the nature of professional work. Therefore, the issue of formation of teachers' creative potential, particularly computer science teachers, remains of current interest, for the conditions for successful self-identity of a personality are created so, intellectual direction of professional training is activated.

Nowadays, the formation and development of creative skills of teachers should be looked into only in the context of continuous professional education, which is implemented during the life of a teacher. Continuous education means systematic cognitive activity conducted to inculcate and improve knowledge and skills acquired



in secondary and specialized educational establishments, and through self-education. A continuous pedagogical education, which is essentially a part of lifelong learning, is a system of training teachers for secondary schools of all types, which provides unity of three phases: Pre-training of senior school children, fundamental training of future teachers in pedagogical higher educational establishments, postgraduate education for teaching staff [2, p. 11].

The concept of "creativity" (from the Latin. Creatio - creation) has been used in science since the 70's of the last century and symbolizes a creative personality, characterized by a commitment to creating innovative ideas that deviate from traditional or accepted patterns of thinking, and the ones which are included in the structure of giftedness as an independent factor [3].

Literature review

Problems of becoming a creative individuality of a teacher have been studied by many famous scientists: R.S. Gurevich, I.A. Zyazyun, V.A. Kan-Kalyk, N.V. Kichuk, V.G. Flint, L.M. Lusin, M.D. Nikandrov, N.M. Potashnyk, V.A. Slastonin, S.O. Sysoiev, G.S. Tarasenko and others.\

The main text

Saying computer science teacher's creativity we understand the integral quality that determines the ability of an individual to generate original, unique, innovative ideas for solving various professional educational problems that arise in the educational process. It is characterized by the ability of teachers to see a pedagogical problem in time, develop creative ways to solve it and act not on the pattern but in an original, typical of only him way [4, p. 162].

We offer to assess creativity of computer science teachers on the basis of general and specific criteria of creativity. General criteria characterize the degree of development of individual creativity, in this case the teacher, without taking into account their creative abilities related to professional activities, the performance of their daily professional duties. That is, these indicators determine the level of formation of creative qualities of a person who in the future could be in any profession. In our opinion general criteria of creativity include: associativity, flexible



thinking, the ability to recombine, intuitiveness, originality, fluency of thinking.

Let us briefly describe each of them: 1) associativity is the ability to establish logical connections between events, objects and their properties; 2) flexibility of thinking is the ability to apply various strategies while solving problems; 3) ability to recombine is the ability to quickly reshuffle ideas that arise; 4) intuitiveness is the ability to anticipate certain events, properties of objects; 5) originality is the ability to produce unusual, innovative ideas; 6) fluency of thinking is the number of ideas that arise per time unit.

Special criteria of creativity are the parameters that are typical of particular specialty teachers, particularly computer science teachers, which determine their readiness for creativity in teaching the subject. They characterize the ability of the teacher to apply a creative approach to teaching school computer science course, to teach students this discipline through the use of heuristic methods and techniques, to shape and develop their strong creative potential. The special criteria of creativity include ability for teaching creatively, use of computer technology in the educational process, the level of development of algorithmic thinking. Each of the specific criteria of creativity is characterized by a number of parameters that must be considered during the psychological and pedagogical studies of teachers.

Criterion 'ability to pedagogical creativity' is characterized as follows: 1) knowledge of the basic features of creativity and ability to diagnose students' creative skills; 2) use of heuristic teaching methods; 3) the ability to notice a pedagogical problem and solve it successfully.

The main parameters of the criterion "use of computer technology in the educational process" include: 1) profound knowledge of modern programming languages; 2) use of computer software at lessons for educational purposes; 3) the ability to create their own educational software.

Criterion "level of development of algorithmic thinking" is characterized as follows: 1) the ability to solve the problem following a general algorithm; 2) the ability to adapt a general algorithm to conditions of a problem; 3) the ability to make their own algorithms for solving nonstandard problems.



Development of creativity of teachers, particularly computer science teachers, is a continuous, long-term process that requires significant efforts from both the teachers and the man himself. It should last during the life of a professional and involves overcoming certain obstacles that may arise along the way.

Let us look into the main stages of which, in our opinion, the modern system of continuous professional education of computer science teachers should consist.

1. Propaedeutic training, which involves teaching students-future teachers in secondary schools (classes) with advanced study of computer science and in institutions of primary and secondary professional education. This stage in the development of the individual for future pedagogical professional activities, the ability to self-development, a sense of importance of pedagogical science and teaching profession, including computer science, has been considered by us as basic.

G.A. Ball and P.S. Perepelytsya believe that special career guidance and pre-professional training, which includes involvement of students in activities a natural extension of which will be training in a certain profession, should be the elements of preparing young people for choosing a profession [1, p. 152]. In determining the stages of specialized pre-professional training scientists take the fact that procedural training is a complex transitional way from undifferentiated content of education to vocational education. This path involves gradual deepening of specialization and specification preparation.

2. Basic training of future computer science teachers in higher educational institutions should be implemented on the basis of the unity of theory and practice in teacher formation and development of their creativity, awareness of their potential capacity for innovation in finding future pedagogical activities.

Professional training of future computer science teachers for secondary schools and specialized schools should be conducted on basic and advanced levels of difficulty respectively. The knowledge and skills in computer science should be formed while studying the disciplines for professional training, additional professional training and optional courses. The list of subjects for specialized training of computer science teachers is determined by certain pedagogical educational



institutions depending on the specialization of future teachers.

3. Postgraduate Pedagogical Education, which provides periodic training of computer science teachers at the Institute of Postgraduate Education, should be implemented on the basis of andragogical principles. This stage is considered by us as the longest of all, focused on individual self-fulfillment of the idea of vocational education lifelong, self-improvement of the system of professional activity values, self-actualized creativity, productive perception of the real needs of education.

4. Non-formal and informal education, which optionally is organized and systematic character, may be implemented outside the traditional school system and university education and covers people of all ages. In this sector innovative approaches are used most often and innovative teaching methods are probated. Those computer science teachers who have access to modern information technology and are interested in their wide use can actively use the opportunities of non-formal and informal education systems.

Summary and conclusions

Thus, with the purpose of formation of creative abilities of teachers, particularly computer science teachers, in the process of lifelong learning it is necessary to combine their visual-cognitive and creative activities. Targeted training of flexibility of thinking, associativity, using imagination, intuition, research teaching methods - all of it contributes to the development of their creative potential.

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Анотація

Вступ. В роботі розглядаються основоположні принципи формування креативного потенціалу педагогів, зокрема вчителів інформатики, протягом життя.

Основний текст. Під креативністю вчителя інформатики ми розуміємо інтегральну якість, що визначає здатність особистості до генерування оригінальних, неповторних, новаторських ідей для вирішення різноманітних фахових педагогічних завдань, які виникають у навчально-виховному процесі. Креативність учителів інформатики ми пропонуємо оцінювати на основі загальних і спеціальних критеріїв креативності.

Розвиток креативності вчителя, зокрема інформатики, – це неперервний процес, який має тривати протягом життя фахівця й має складатися з таких основних етапів: 1. Пропедевтична підготовка, яка передбачає навчання учнів-майбутніх педагогів у загальноосвітніх школах (класах) з поглибленим вивченням інформатики та в закладах початкової і середньої професійної освіти. 2. Базова професійна підготовка майбутніх учителів інформатики у вищих педагогічних навчальних закладах. 3. Післядипломна педагогічна освіта, яка передбачає періодичне підвищення кваліфікації вчителів інформатики при інститутах післядипломної педагогічної освіти. 4. Неформальна та інформальна освіта, яка необов'язково має організований та систематичний характер, і може здійснюватися поза межами системи традиційної шкільної й університетської освіти та охоплює осіб різного віку.

Висновки. Із метою формування креативних здібностей вчителів інформатики у процесі навчання протягом життя необхідно поєднувати їхню наочно-пізнавальну й творчу діяльність, створювати психолого-педагогічні умови, які сприяють розвитку творчого потенціалу педагогів.

Ключові слова: креативність учителів інформатики, неперервна професійна освіта педагогів.

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Reviewer: Prof. Mogilevskiy V.J.

Article sent: 05/02/2017

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j12-065

DOI: 10.21893/2227-6920.2017-12.065

**THE ABILITY TO VISUALIZE THE TEACHING MATERIAL
AS THE IC-COMPETENCE OF FUTURE TEACHERS OF PHYSICS
УМЕНИЕ ВИЗУАЛИЗИРОВАТЬ УЧЕБНЫЙ МАТЕРИАЛ
КАК ИК-КОМПЕТЕНТНОСТЬ БУДУЩИХ УЧИТЕЛЕЙ ФИЗИКИ**

Yurchenko A.A. / Юрченко А. А.

Makarenko Sumy State Pedagogical University,

Ukraine, Sumy, Romenskaya, 87, 40002

Сумський державний педагогічний університет імені А.С.Макаренка,

Україна, Суми, Роменська, 87, 40002

Abstract. The article analyzes the interpretation of the concept of IC competence of scientists and researchers. Updated information on magnetic disks, their physical properties and structure. There is an example of a visualization of the author of the training material in the form of a clear position. Disclosed elements of effective use of visualization in the learning process. It is concluded that the approach using visibility forms the IC competence of future teachers of physics.

Key words: IC competence, visualization, information technology, educational stand.

Introduction

Modern education cannot be imagined without information and communication technologies (ICT). ICT development is connected with the intensive process of creating new information technologies, resources, systems and Internet-based learning environments.

Now ICT include hardware (computers, servers) and software (operating systems, network protocols, search engines, etc.). Their capabilities are widely used during the learning process. Large amounts of information are not perceived quickly through the reading, but may be perceived visually in the form of charts, graphs, images, and the like.

1. The Research Analysis



A modern scientist or a specialist needs to acquire the IC competence. The concept of IC competence has a diverse interpretation in the scientific literature.

Elizarov A. [2] under the IC competence understands the totality of knowledge, skills and experience, and presence this experience is determining in relation to the performance of professional functions. Shilova O. and Lebedev M. determine the IC competence as the individual's ability to solve educational, life, professional tasks using information and communication technologies [4]. Nazarova N. says it's the motivation, need and interest in obtaining knowledge and skills in the field of technical, software and information.

Competence of teachers in ICT is considered Gorbunova L. and Semibratova A. as the willingness and ability of the teacher to independently and responsibly use these technologies in their professional activities.

Ukrainian scientists also revealed the contents of key competences in ICT (Ovcharuk V., Zhaldak N., Morse N., Bykov V., Spirin O., etc.) [6]. They allow you to navigate in the information space, get information and manage it in accordance with their own needs and requirements of the modern information society.

IC competence we understand the ability to use ICT for the implementation of information activities (information search, its definitions and organization, management, and analysis, as well as its creation and distribution) in the professional sphere.

2. The Main Text

Physics is a complex science which is rapidly moving forward and is closely connected with modern information systems, in particular, is the basis of all data operations. Their understanding characterizes the level of knowledge about the physical foundations of the processes and competences in the IC field of the future teachers of physics.

So, we propose the tasks associated with the visualization on the computer the physical basis of record data on magnetic disks. As you know, charts, tables, pictures on the stands give the opportunity to not only briefly to transfer some of the training material, but also to systematize and generalize knowledge of students.

Consider the example of visualization of educational content on the example of studying the topic of "Magnetic disks".

Analyzing the theoretical material of the topic, we can conclude that such a topic as "Magnetic disks. Function and structure" has a very large amount of material, but as a rule, the study of this topic is given not so much time. And remember a large amount of material is not so easy. Therefore, we developed a visual stand (fig. 1) the most important parts of the material (the structure of the magnetic disk, the structure of the magnetic coating, the physical basics of reading, logical and physical basis of recording data to them, etc.) [3].

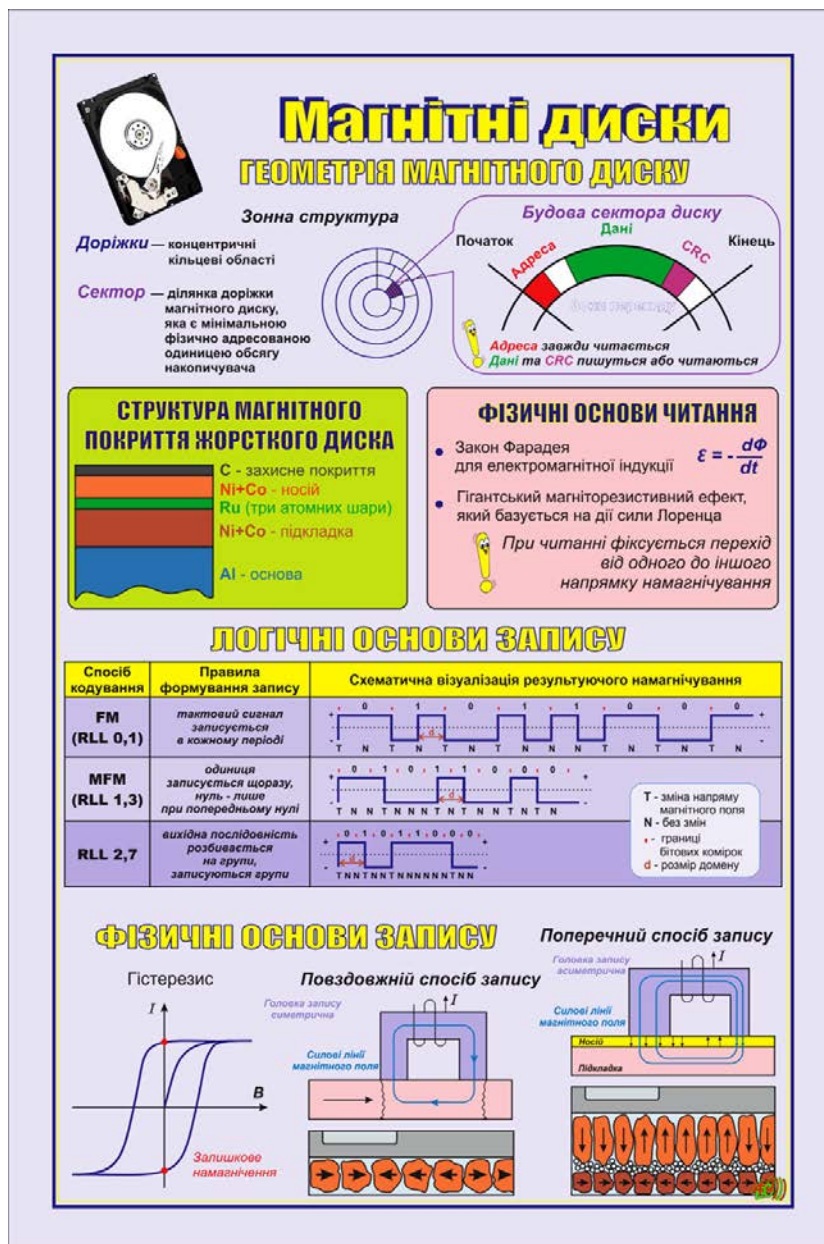


Fig. 1. Visualization of educational material in the form of visual stand



The author's visualization of the educational material is not widespread, but the ideas contained in the proposed poster material, promote understanding, memorization, generalization and systematization of knowledge on information technology.

Such approaches to the visualization of the material in the training allow an active use of computer graphics, provide analysis of information sources and extracting the main of large amounts of information and form a comprehensive view of the physical processes of functioning of information systems, which in turn generates the IC competence of future teachers of physics [13].

Psychological and pedagogical research on the use of clarity, argued that the construction can be viewed as a tool to improve learning efficiency, and this efficiency is based on visual communication, which should be of interest to the study subjects and to convince them that this issue is important and necessary. Development of visual materials requires a combination of knowledge and skills not only in an academic subject (this is not enough to create a training stand), and in information technology, psychology, aesthetics, design and even the creation of promotional products [10].

3. Design implementation of the project

Often there are cases when the electronic version of the posters created by experts in the field of computer graphics. They professionally and quickly carry out the order, but the overall result does not always satisfy the customers (bad color scheme or the visual emphasis on the wrong material, or the absence of links between fragments, etc.) or the result of the vision of the executors of the order and clients are different. Thus, the task of the developer assigned to the project.

In this case you should pay attention to the following [10].

1. The definition of a visual type of stand – sound approach to the development of clarity training requires the creation of not boring an image or a list of laws, and pronounced the essence of the information that you bring to the stand.

2. Composite presentation of the material – the perception of information (text, numbers), located on the edge requires much more effort than the perception of



information located closer to the center. Therefore, designers suggest on the perimeter to try to leave the zone or to create stands with an asymmetrical composition.

3. Color of presentation is the most important instrument of the associative-creative expression of the theme, so when you make the stand it should be remembered that color affects a person emotionally: it can affect mood, change visual perception of the volume and shape of the depicted objects. What would the stand was expressive it is recommended to use limited number of colors (two or three). A large number of them creates excessive diversity and complicates the perception of information.

Conclusion

The effectiveness of the use of illustration is composed of many factors, among which are the right selection of subjects, a weighted content quality design training stand.

Stand design with a specific academic subject is the visual epitome of the course. The most important components of effective visualization are not only professional content of the educational material, and the aesthetic impression of the stand, ensuring the formation of positive learning motivation.

The peculiarities of attention, perception and thinking of the subjects of study is not only a powerful tool in the professional work of teachers, but is also a basis for visual impact on the subjects of learning.

This approach gives a visual representation of complex topics in the form of tables, schemes, images are grouped into a visual stand implements interdisciplinary connections courses in physics and computer science, promotes conscious understanding by future teachers of physics and Informatics teaching material. As practice shows, the visualization of educational material directly affects the quality of learning, and her perception of using various mobile media (tablets, smartphones, etc.) allows to approach the technology widespread education and with information technology to upgrade the quality of presentation of educational material.

In our experience, the combination of physical knowledge and knowledge and



skills in the field of IC not only deepens the competence of future teachers of physics, but also gives increase motivation to learn and to teach others [1; 5; 7-9; 11-15]. Such approaches in training combine modern trends of Informatization of society and with it to form a systemic view of the physical processes of functioning of information systems, which, in turn, affect the level of IC competence of future teachers of physics.

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Аннотация. В статье проанализированы толкования понятия ИК-компетентность ученых исследователей. Уточненная информация об магнитных дисках, их физический свойствах и строению. Наведен пример авторской визуализации учебного материала в виде наглядного стенда. Раскрыты элементы эффективности использования наглядности в учебном процессе. Сделаны выводы, что подход использования наглядности формирует ИК-компетентности будущих учителей физики.

Ключевые слова: ИК-компетентность, визуализация, информационные технологии, учебный стенд.



j12-066

DOI: 10.21893/2227-6920.2017-12.066

UDC 378.14:37.036:373.3

**PEDAGOGICAL CONDITIONS OF TEACHERS' TRAINING TO
FORMATION OF CHILDREN'S AESTHETIC EXPERIENCE**

**ПЕДАГОГІЧНІ УМОВИ ПІДГОТОВКИ ПЕДАГОГІВ ДО ФОРМУВАННЯ
ЕСТЕТИЧНОГО ДОСВІДУ ДІТЕЙ**

Rakhalchuk N.O., Holiuk O.A. / Пахальчук Н.О., Голюк О.А.

ORCID: [http:// orcid.org/0000-0001-7098-3821](http://orcid.org/0000-0001-7098-3821)

Vinnitsia State Pedagogical University named after Mykhaylo Kotsiubynsky

Vinnitsya, 32 Ostrozkiy str., 21100

*Вінницький державний педагогічний університет імені Михайла Коцюбинського м.Вінниця,
вул. Острозького, 32, 21100*

Abstract. *In the article the problem of prospective primary school teachers' training to formation of junior schoolchildren's aesthetic experience is considered as a complicated and multiaspect process. In author's opinion, the effective solution of the particular problem and the quality of obtained results are dependent on development of certain pedagogical conditions in the study (ensuring of interaction between scientific and artistic approaches to teachers' professionally oriented training; mastering algorithms of aesthetic upbringing activities with junior schoolchildren by prospective primary school teachers; activation of artistic thinking of prospective specialists with the aim of enriching their own aesthetic experience; attracting students to formation of aesthetic experience of the child in the process of passing different types of teaching practice). In the article the examples of author's methods and algorithms of work with students are presented. The variants of aesthetically directed tasks for teacher's training practice are described. The paper studies teaching objectives and features of the special seminar "The Ways of Formation of Aesthetic Experience of Junior Schoolchildren" and the stages of the seminar's procedure. The criteria and levels (formal, partly-productive, creative) of readiness of teachers to formation of aesthetic experience of schoolchildren are defined.*



Key words: *aesthetic experience, preparation of prospective primary school teachers, pedagogical conditions, teacher's training practice.*

Introduction. The leading role in personality's formation belongs to the teacher, and first of all, – to the teacher of primary school, who provides the fundamentals of spirituality, education, culture and life experience of the child. In terms of modernization of the national system of education there is a necessity to reinterpret the experience of teachers' training. The modern primary school is characterized by system changes in structure and content of the educational process that predetermines the need of training a new generation teacher as a professional and cultured personality, who is able to form, expand and enrich the child's experience. Nowadays active searching of optimal ways for improvement of structure and content of primary education is carried out. There is a shift from the cognitive approach in organization of the educational process, which is characterized by learning a certain system of knowledge, abilities and skills to the open structures of the child's aesthetic experience, where intellectual, valued and activities components are interacted.

Literature review. The importance of aesthetic and pedagogical training of prospective primary school teachers is emphasized repeatedly by scientists. In the context of our research, the most significant issues are philosophical and methodological fundamentals of teacher's training to educational and upbringing activities, the main psychological principles of features of the teacher work, the features of the professional teachers' training in higher educational institutions, theoretical and methodological bases of teachers' training of the 1st degree school, the formation of students' readiness to aesthetic activities, international experience of aesthetic teachers' training is analyzed [1, 2, 3, 4, 5, 6, 7, etc.].

Thus, T. Kryvosheya examines the issue of correlation of intellectual and aesthetic activities that is practically realized through the integration of artistic and scientific approaches to the development of mathematical concepts and formation of mathematical concepts, learning the abstract mathematical information through the images, the introduction of special games and tasks that require switching from one kind of thinking to another with the purpose of strengthening integration between



hemispheres of a head [8]. O. Hroshovenko reveals the problem of integrated and humanistic approach in ecologically natural and aesthetic preparation of teachers [9].

The relevance and appropriateness of the choice of theme is identified by the necessity to improve the professional training of prospective primary school teachers in accordance with the requirements of the society to the professionalism of the teachers in the field of aesthetic education; the need to preserving the spiritual value of the content of the educational process in times of rapid social change; contradictions between psychological and physiological features of primary school age as a sensitive period of formation of the child's aesthetic experience and the insufficient level of students' training to the certain activities in Ukrainian higher educational institutions.

Aim and research problems.

Aim – to identify pedagogical conditions of teachers' training to formation of pupils' aesthetic experience and presentation of examples of practical implementation of the stated conditions.

Research problems: are to develop and justify the pedagogical conditions of prospective primary school teachers' training to investigating activities and to identify specific features of their realization in education process of higher educational institution.

The main text. Analysis of pedagogical conditions of teachers' training to formation of aesthetic experience of junior schoolchildren. Circumstances that promote the development of creative activities, realization of creative approach to solving problems of aesthetic education of junior schoolchildren, activation of aesthetic potential of personalities of prospective teachers, ensuring the position of active subjects of activities, harmony cognition of reality may be considered as pedagogical conditions of productivity of process of students' training to formation of the child's aesthetic experience. The following conditions are identified:

1. *Ensuring of interaction between scientific and artistic approaches to teachers' professionally oriented training.* Modern interpretation of innovation processes in the training of prospective specialists in educational institutions directs



higher education to combination of different forms of public consciousness in the educational process with students. However, present practice shows that today it is still kept a significant imbalance between scientific and artistic world cognition. Thus, researchers rightly emphasize that “science and art are combined in a high impulse to harmonize the relationship between a human being and nature” [10].

The interaction and mutual enrichment of science and art guarantee diversified development of spirituality of prospective teachers in the process of professional training to formation of the child’s aesthetic experience. Interaction between scientific and artistic approaches to mastering educational material creates the real possibilities of simultaneous inclusion in the educational process of a higher educational establishment of two forms of world cognition – the rational-logical form and the emotional-sensual one. Science recognizes the real object and the art forms the attitude to it. V. Romenets urged not to look for “difference between these kinds of creativity as science does not give us the pleasure of art and art is just intended to give it. Science opens up new opportunities for meaningful artistic pleasure” [11]. The following examples are methods which were used in the educational process in Vinnytsia State Pedagogical University named after Mykhailo Kotsiubynskyi (Ukraine).

The method “Heard, Seen, Remembered” is presented by a fairy representation of scientific information (concepts, rules, etc.) with its parallel graphical image on the board. It is given an example of a fairy presentation of pedagogical communication styles of flirting and intimidation prepared by Oksana K.: *“In one the Kingdom a girl Asolka lived. On her birthday her mother presented a magic pot of flowers and said: “If you make friends with them, the flowers will start to talk. You are given five days.” The first day Asolka decided to water the flowers much and took them under the burning sun for the whole day. The girl danced, sang songs, told fairy-tales to them. In the evening the mother said: “you can’t contract a friendship with flowers by flirting.” The next day Asolka thought: “I’ll intimidate naughty flowers!” However, the flowers were silent again.”*

The method “Artistic Researches” consisted in identifying the leading themes of



creativity of artists on the basis of presented works. Here is an example of the artistic study of Taras Shevchenko's heritage, by student Natalia S.: themes of Ukrainian history ("Taras Bulba with his sons", "The death of Bohdan Khmelnytskyi", "Maria" (based on the poem "Poltava" by Oleksandr Pushkin); the Ukrainian architectural and archaeological monuments ("Pochayiv Lavra from the West", "The Monastery in Poltava); a peasant destiny ("Kateryna", "Gipsy woman fortune-teller", "The peasant family"); the character in the self-portrait ("Self-portrait" (1840), "Self-portrait with a candle" (1845)).

The method "Art Glasses" was cleared up in scientific and artistic description of the objects of everyday reality. Procedure: "Describe the exhibit" (students describe the subject proposed by teacher); "Language treasure" (students choose comparisons, adjectives to the proposed exhibit); "Put on your glasses" (drawing artistic description). The scientific and enhanced artistic descriptions of the globe by student Tamara S. are presented: "The globe is a reduced model of the Earth. There are islands, lakes and rivers, continents, seas and oceans on it. With its help you can get to any point of the globe, defining the length and width"; "The blue-eyed globe is a reduced model of the planet Earth. It allows sailing down the rough Southern Bug to the dreaming Dnieper, and then close to the Black Sea, while determining the length and width of any point of the journey. Clear lakes and swift rivers, picturesque and mysterious islands, endless continents – all of them can be gathered in your hands.

2. *Mastering algorithms of aesthetic upbringing activities with junior schoolchildren by prospective primary school teachers.* The particular condition is based on P. Halperin's theory of stage formation of mental actions. In the research, P. Halperin points out approximate functional component that determines the patterns of transition from outside materialized to inside mental actions and is characterized by shape, degree of generalization, level of assimilation and necessary conditions for productive execution of actions, as well as [12]. The researchers state that the approximate basis of actions can be demonstrated to students in different forms: as a sample action, a verbal explanation with simultaneous display of the action, a phased algorithm, etc. [13].



It is important to focus prospective teachers on activity stages (preparatory, primary, final), exemplify the content of each stage and encourage students to create their own algorithms. In this case, the teacher acts as a consultant, who occupies the assistant position, directs the process of information exchange, accompanies the students' own search of possible solutions, contributes to finding solutions and formulating conclusions, etc. The researchers also stress on expediency of creation of a certain support for the technological solution, a certain algorithm, which sets the quality of operational choices [14]. The students are exemplified the algorithm of conducting lesson of admiring the beauty of the work:

1. Indirect representation of the profession (a riddle, a poem with missing words, etc.), the introduction to a fairy situation. The task "The Sun Rays": selection of metaphors, comparisons, positive association of the profession; understanding the aesthetic peculiarity of the profession; exploring the work technology of the provided profession; presenting the history of the profession and interesting information about it.

2. Pieces of arts presentation (poems, tales, riddles, songs, music and fine art works, etc.), where the profession is shown by positive emotions. The process of thinking over the questions of evaluation character. Reflections on the theme: "What would happen if there was no profession...", Solving pedagogical situations (the teacher offers to solve fabulous and life situations, that associated with the represented profession). Drafting a letter of appreciation ("We are grateful to you for"), a letter of apologies ("Forgive us"), a letter of wishes ("We wish you"). Compiling quatrains (four-line verse) about the profession. The selection of practical tasks of creative nature to reinforce impressions.

It is advisable to involve prospective teachers in game activities and acquaint them with the algorithms of aesthetic games for junior schoolchildren. The role of play in the development of the child's experience by the cognition of the world is emphasized by a number of researches (D. Elkonin, O. Zaporozhets, O. Leontiev, V. Romenets, etc.), so as in the game process the enrichment and refinement of the existing experience is operated. The special attention should be paid to the algorithms



of long-lasting aesthetic games that cover the entire school year and promote a logical relationship, continuity of various forms of educational work in primary school. Thus, constructing the pedagogical process, firstly, it is advisable to familiarize students with algorithms of aesthetic and educational work on the formation of aesthetic experience of junior schoolchildren; secondly, the proposed algorithms shouldn't limit but create space for pedagogical creativity.

3. Activation of artistic thinking of prospective specialists with the aim of enriching their own aesthetic experience. The problem of the development of teacher's thinking is multifaceted and diverse. It is confirmed by the many psychological and pedagogical works (I. Bekh, V. Moliako, L. Nechaieva, V. Shakhov, etc.). The scientists emphasize that due to the perception of art works, all the components of the personality's artistic thinking are developed. The researchers also highlight the significant value of beauty, expressiveness and harmony of nature for the process of revitalization of the artistic thinking of the personality. According to H. Tarasenko's reasonable comment "the artistic creativity, based on the advanced artistic thinking, operates the real images and gives possibility to analyze the most complex and the most delicate facets of reality, the slightest signs of aesthetic in nature, realize them and build own attitude to them, compare them optionally and sensually with own moral and aesthetic ideals" [15].

The structure of the artistic thinking combines an emotional and sensual component and an intellectual and rational component that is why it is important to encourage prospective professionals to a deep analysis of the internal contents of the artistic works, conclusions and logical generalizations. In the context of the particular requirement it is advisable to organize group activities of prospective teachers in order to search the plot of artistic work and its means of expression. It is also worthwhile to practice the work of all student audience on a joint task. In the process of artistic and creative activities and the development of artistic tasks it should be taken into account the specifics of future professional activities of primary school teachers and directly particular structure and functioning of aesthetic experience of junior schoolchildren.



The tasks for enhance students' artistic thinking are exemplified: match the sounds of nature (rain, ocean, nightingale's song, etc.), with the listed corresponding works of art; paint colour palette to a literary work and explain the choice; select art works from the primary school programme which are associated with certain verbal image; create a complete story, a fairy-tale from proposed art works; compare heard, seen and imagined samples (for example, one student describes verbally the picture of E. Degas "The Dance Lesson", another student imagines mentally this art work, entitles it and then, looking at the picture, draws conclusions and makes adjustments in description), etc.

In our opinion, the artistic thinking is a synthesized cognitive process where an artistic image is the bases and the result of this process. The artistic image summarizes the reality in associative, metaphorical, emotional and pictorial way. In order to ensure the productive contact of junior schoolchildren with the beauty and originality of the environment, the effective usage of art images, it is advisable in the training process of primary school teachers to promote activation of teachers' artistic thinking by means of artistic and creative activities. The artistic thinking of the teacher will facilitate expressiveness, creativity, initiative, variability in the selection of methods and forms of educational work with junior schoolchildren.

4. Attracting students to formation of aesthetic experience of the child in the process of passing different types of teaching practice. Teaching practice is an essential part of the educational process of training teachers of primary school to formation of the child's aesthetic experience that solves tasks of establishing and improving the skills of aesthetic upbringing work with junior schoolchildren. Exploring the issue of organizational and methodical support of teaching practice, its main functions are determined. These, in particular, are updating, expansion, deepening of the knowledge obtained during professional training and its creative application in own teaching activities, formation of various abilities and skills, improvement of the nature of activities, its transition from the reproductive performance of concrete actions to effective creative productivity, development of pedagogical thinking, formation of foundations of professional skill and others.



The researchers emphasize that the teaching practice is not always corresponded to the requirements and not fully performs its functions for solving determined tasks [16, 15]. It is considered that one of the important conditions for improving the effectiveness of teaching practice in the system of training of prospective specialists in formation of aesthetic experience of junior schoolchildren is to enhance its aesthetic orientation. The researchers note that “the teaching practice includes students in a real pedagogical process, where the aesthetic education is part of this process, updates the system of theoretical knowledge of Aesthetics, Art History, Psychology, Pedagogics and Methods of Aesthetic Education, equips of system special skills” [17]. The variants are given about aesthetic oriented tasks for teaching practice:

1. Make a graphic model of the artistic and aesthetic design of class interior (titles of stands, corners, their content, placement, color solutions) using aesthetic and educational potential of objects and phenomena of the surrounding reality and the integration of the arts. Offer and introduce a certain system of work with schoolchildren using these stands, with the aim of diversifying the aesthetic preferences and tastes of children. Share own arguments on the issue of enrichment of valuable areas of schoolchildren in the process of formation of their aesthetic experience. On the basis of own observations to carry out expert evaluation of the effectiveness of formation of aesthetic experience of junior schoolchildren at lessons of natural and mathematical cycle.

2. Offer possible topics of Labour Affairs with junior schoolchildren and organize one of them. Determine the guidelines for teachers of primary school on improvement of the process of motivation of labour activities of junior schoolchildren from the position of beauty.

3. Participate in the parents' meeting with the aesthetic and pedagogical speech on the theme: “The Art of Relationships in the Family”, “Aesthetic Activities of the Whole Family”, “Creating a World of Beauty by Own Hands”, etc. Prepare and conduct the aesthetic breaks, predict the further involvement of artistic works in the process of active educational and cognitive activities of schoolchildren with the aim



of deepening the aesthetic perception of the surrounding reality and art. Develop a questionnaire (research conversation) and conduct a psychological and pedagogical research to identify the place of the method of creating aesthetic and educational situations in the work of teachers of primary school.

In order to increase the effectiveness of training of prospective primary school teachers to formation of aesthetic experience of junior schoolchildren, the special seminar “The Ways of Formation of Aesthetic Experience of Junior Schoolchildren” was developed. The main objective of the special seminar is to add, specify, systematize and generalize students’ knowledge, abilities and skills which were learnt in the process of studying of psychological and pedagogical disciplines and methods. The special seminar is carried out by using interactive, problem-search, creative training methods, role-plays, author’s methods of teaching. The peculiarity of the special seminar teaching is that students’ assimilation of a part of the issues for the theoretical discussion is provided in class directly using interactive technologies. Each lesson has approximately 3 stages: *aesthetic preparatory* (express-survey of students with the theoretical material; using tasks that contribute to the aesthetic development of the student); *practical activities* (presentation of algorithms of formation of aesthetic experience of junior schoolchildren; students’ creative group work of developing pedagogical projects using the proposed method); *analytical summarizing* (conclusions, separation of personal and professional achievements, lesson outcomes, evaluation of own activities). According to the content of the special seminar, a notebook of individual training of prospective primary school teacher to formation of aesthetic experience of junior schoolchildren “Journey to the Secrets of Beauty and Creativity” was designed.

Results of the research. On the basis of the determined criteria of readiness of prospective teachers to formation of children’s aesthetic experience (ability to expand aesthetic thesaurus of junior schoolchildren; focusing on correction of value sphere of pupils by aesthetic means; quality of ensure of creative self-realization of the child in aesthetic activities), levels of readiness: formal (low), partly-productive (average), creative (high) are distinguished. Study of real state of prospective primary school



teachers' training to formation of junior schoolchildren's aesthetic experience in higher educational establishments (Vinnytsia State Pedagogical University named after Mykhailo Kotsiubynskyi, Hlukhiv State Pedagogical University, Vasyl Stefanyk Precarpathian National University, Yuriy Fedkovych Chernivtsi National University) found out the predominance of low level (79.2% of students) of readiness to investigating activities of experiment participants. It is confirmed their unsatisfied readiness to formation of aesthetic experience of junior schoolchildren. As a result of implementation of methods of prospective primary school teachers' training to formation of junior schoolchildren's which are based on the complex of techniques to formation of aesthetic experience of junior schoolchildren while teaching the disciplines of professionally-oriented training cycle and special seminar "The Ways of Formation of Aesthetic Experience of Junior Schoolchildren", the increasing level of readiness of students of experimental groups to investigating activities (number of students with the high level of readiness has increased on 13.5% and, accordingly, on 28.9% of students with the average level of readiness) is identified.

Conclusions. The modern educator must be able to attract artistic images in educational work with junior schoolchildren; enhance the aesthetic perception of the children of the surrounding reality, in all its diversity; promote the relationship of scientific concepts and aesthetic essence of environment; ensure the accumulation of aesthetic experience of personality and others. In the context of performed study, the aesthetic experience of a junior schoolchild is determined as a generalized component of aesthetic activities that includes the most important spiritual and practical aspects of children's interaction with the outside world and reveals a personal system of attitudes to the world. Further study is required to the question of development of ways using multimedia technologies in training of prospective primary school teacher to explored activities and pedagogical conditions of their implementation in higher educational institutions and the problem of training teachers in terms of the 1st degree school to formation of aesthetic experience of children with special needs as well as.

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***Аннотация.** В статье определены педагогические условия подготовки будущих учителей начальных классов к формированию эстетического опыта детей. В работе описаны примеры реализации представленных условий в высшем учебном заведении, алгоритмы проведения уроков любования красотой труда, задания на педагогическую практику студентов, примеры приемов работы с будущими специалистами. В статье представлены авторские определения понятий "художественное мышление", "эстетический опыт младших школьников".*

***Ключевые слова:** эстетический опыт, подготовка учителей начальных классов, педагогические условия, педагогическая практика*

**AGRICULTURE****j12-017****DOI: 10.21893/2227-6920.2017-12.017****AGROCHEMICAL SUBSTANTIATION OF FERTILIZERS USE UNDER
SPRING WHEAT ON MEADOW- CHERNOZEM SOIL****АГРОХІМІЧНЕ ОБГРУНТУВАННЯ ВИКОРИСТАННЯ ДОБРІВ ПІД
ЯРУ ПШЕНИЦЮ НА ЛУЧНО-ЧОРНОЗЕМНОМУ ГРУНТІ****к.с.-н.г., доц. Кудрявицька А.М. / с.а.с. ., as.prof. Kudriawytzka A.N.***National University of Life and Environmental Sciences of Ukraine**Kyiv, street of Heroes of defensive, 17, 03041**Національний університет біоресурсів і природокористування України.**м. Київ, вул. Героїв оборони, 17, 03041*

Abstract. According to our results, long-term mineral fertilizers application on the background of 30 t/ha manure aftereffect promotes maintenance of constant humus content, substantial increasing of nutrients content in arable and subarable soil layers.

Systematic fertilizer application in crop rotation has a sufficient influence on dry substance accumulation by wheat plants, and accordingly on nutrients content in plants and as a result on their carrying out with the yield.

Effectiveness of long-term fertilizers application in crop rotation and its direct application in meadow-chernozem calcareous soil were determined.

Key words: fertilizers, foliar dressing, yield, quality, soil, nutrients, cultivar, dynamics, ammonium fractions.

Introduction.

The rational use of fertilizers promotes the productivity of soil and creates favourable terms for a height and development of plants of furious wheat. Top-dressing is a basic factor that stipulates the accumulation of nutritives in soil and use of them in the process of forming of harvest of furious wheat [1-2].

A harvest of furious wheat is the result of difficult cooperation of plant with the terms of environment and determined mainly by correlation of two sizes are numbers



of stems on unit of area and mass of grain from one colossus. Each of these sizes in turn depends on other elements of structure of harvest [3-4].

Therefore question about influence of terms of growing, biological features of sort, agroecological ground, in relation to establishment of optimal doses of mineral and organic fertilizers on a harvest and quality of grain of furious wheat the practical.

The main text.

The results of researches testify that the protracted application of fertilizers in a crop rotation positively influenced on the height of plants of furious wheat Mironivska furious. It is set that middle length of plants of furious wheat in a variant control (without fertilizers) of - a 65,4 cm, on the fertilized variants this index hesitated - a 68,3-84,5 cm (table.1).

The analysis of data on the structure of harvest of furious wheat the Mirovivska furious testifies that the index of general bushyness on control equaled 2,5, productive - 2,4.

Higher were indexes of hall and productive bushyness on the fertilized variants and presented according to 2,6-3,0 general bushyness and 2,5-2,8 productive bushyness (table. 1).

The harvest of furious wheat depends on length of ear and his gap-fillingness grain. Top-dressing assists the improvement of diet of plants, promotes.

Length of ear on a 0,5-1,9 cm was anymore on the fertilized variants comparatively with control, where she presented a 5,9 cm. The results of researches testify that most length of - a 7,8 cm, amount of - 16,3 шт and amount of grains i- 32,7 th in the plants of furious wheat marked at bringing of one-and-a-half norm of mineral fertilizers ($N_{110}P_{120}K_{120}$) on a background the afteraction .

These can explain the most high harvest of grain on this variant that presented 3,79 т/and, at a harvest on control - 2,06 т/he (table.2). On the fertilized variants considerably mass rose 1000 grains and presented 42,3-45,1 gs, at mass 1000 grains on- 40,2 gs, that assisted the receipt of higher harvest of grain of furious wheat on the fertilized variants (table.1).



Table 1

**Influence of the protracted application of fertilizers on the structure of harvest
of furious wheat of sort Mironivska furious (2010-2012 years.)**

Variant of experience	plants, cm	The bushyness		The bushyness			The bushyness 10 plants	The bushyness 1000 plants
		general	General productive	general height, cm	general productive, cm	General productive length, c		
Control (without fertilizers)	65,4	2,5	2,4	5,9	12,5	19,4	13,9	40,9
afteraction of 30t/he - FON	68,3	2,6	2,5	6,4	13,5	21,7	15,6	42,3
Background+of P ₈₀	68,3	2,5	2,4	6,5	13,8	23,3	17,0	42,4
Background+of P ₈₀ K ₈₀	75,8	2,7	2,6	6,8	14,1	26,9	19,1	43,4
Background+of N ₈₀ P ₈₀ K ₈₀	83,0	2,9	2,8	7,2	15,5	30,5	20,6	44,5
Background+of N ₁₁₀ P ₁₂₀ K ₁₂₀	84,5	3,0	2,8	7,8	16,3	32,7	22,0	45,1
Background+of N ₈₀ P ₈₀ K ₈₀	80,1	2,7	2,6	6,8	14,8	30,3	19,9	44,0

The results of researches are set that systematic application of mineral fertilizers on a background the afteraction of 30t/he assists a plus to the increase of harvest of grain of furious wheat on 0,61-1,73 t/he, at a harvest on control according to 2,06 t/he (table. 2). The most high harvest is got at bringing of N₁₁₀P₁₂₀K₁₂₀ on a background the afteraction of 30 t/he leave to rot - 3,79 t/he grains of furious wheat.

The least increase of harvest is got on variants, where phosphoric and phosphoric-potassium fertilizers were brought in on a background the afteraction of organic, that presented according to 0,99, 0,81 t/he (table. 2).

Content of albumen and "raw" gluten in grain of wheat depends on the size of the productivity of furious wheat.



Table 2

Influence of the protracted application of fertilizers is on the productivity of grain of furious wheat and indexes of his quality (2010-2012 years)

Variant of experience	Productivity, t/he	Increase, t/he		Content					
		before control	to the background	Albumen %			Raw" gluten %		
				%	collection is a squirrel, τ/he	increase to control τ/he	%	collection of "raw" gluten τ/he	increase to control τ/he
afteraction of 30τ/and - FON	2,06	-	-	14,8	0,3	-	31,9	0,66	-
Background+of P80	2,67	0,61	-	16,1	0,43	0,13	33,7	0,89	0,23
Background+of P80K80	3,05	0,99	0,38	15,6	0,47	0,17	32,4	0,98	0,32
Background+of N80P80K80	2,87	0,81	0,2	16,1	0,46	0,16	33,8	0,96	0,30
Background+of N110P120K120	3,45	1,39	0,78	16,3	0,56	0,26	34,6	1,2	0,54
N80P80K80	3,79	1,73	1,12	16,8	0,64	0,33	36,1	1,36	0,70
Variant of experience	3,21	1,15	0,54	16,2	0,52	0,22	34,4	1,09	0,43

$HIP_{05}, t/he$ 0,24

$S_x, \%$ 0,12

Most content of albumen is got in a variant, where the one-and-a-half norm of mineral fertilizers was brought in on a background the afteraction of 30 t/he - 16,8 %, with the corresponding index of collection of - 0,64 t/he (table. 2). The obtained data testify that most content of "raw" gluten in grain of furious wheat is marked at bringing of $N_{110}P_{120}K_{120}$ on a background the afteraction of 30 t/he to the pus that presented according to -36,1%, from according to high the index of collection of "raw" gluten - 1,36 t/he (table.2).

Some less content of "raw" gluten is marked in a variant, where the single dose of mineral fertilizers was brought in on a background the afteraction of organic- a 34,6 %, collection of "raw" gluten presented accordingly - 1,2 t/he, at content on control of "raw" gluten - 31,9 % and by the index of collection of "raw" gluten - 0,66



t/he.

Summary and Conclusions.

For the receipt of stable harvests of grain of furious wheat of sort Mironivska furious (3,5-4,0 t/he) from accordingly by the high indexes of quality of grain on middling provided with nitrogen, phosphorus and potassium black carbonate soil in grain - to the beet crop rotation agroecological - reasonable is application in the basic fertilizer of $N_{80}P_{120}K_{120}$ on a background the afteraction of 30 t/he leave to rot.

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Анотація

Урожай зерна ярої пшениці та його якість – це основа агрохімічної оцінки тієї чи іншої системи удобрення, яку застосовують в окремих ґрунтово-кліматичних умовах.

Урожай ярої пшениці залежить від довжини колосу та його виповненості зерном. Внесення добрив сприяє покращенню режиму живлення рослин, підвищує величину і озерненість колосу.

Довжина колосу на 0,5–1,9 см була більшою на удобрених варіантах порівняно з контролем, де вона становила 5,9 см. Результати досліджень свідчать про те, що найбільша довжина колосу–7,8 см, кількість озернених колосків–16,3 шт та кількість зерен в колосі–32,7 шт в рослинах ярої пшениці відмічена при внесенні полуторної норми мінеральних добрив ($N_{110}P_{120}K_{120}$) на фоні післядії органічних.

Результатами досліджень встановлено те, що систематичне застосування мінеральних добрив на фоні післядії 30 т/га гною сприяє підвищенню урожаю зерна ярої пшениці на 0,61-1,73 т/га, при урожаї на контролі відповідно 2,06 т/га. Найбільш високий урожай отримано при внесенні $N_{110}P_{120}K_{120}$.на фоні післядії 30 т/га гною – 3,79 т/га зерна ярої пшениці.

Вміст білку та «сирої» клейковини в зерні пшениці залежить від величини урожайності ярої пшениці. Найбільший вміст білку отримано у варіанті, де вносились полуторна норма мінеральних добрив на фоні післядії 30 т/га гною–16,8 %, з відповідним показником збору білку–0,64 т/га. Отримані дані свідчать про те, що найбільший вміст «сирої» клейковини в зерні ярої пшениці відмічений при внесенні $N_{110}P_{120}K_{120}$.на фоні післядії 30 т/га гною, який становив відповідно -36,1%, з відповідно високим показником збору «сирої» клейковини – 1,36 т/га.

Ключові слова: пшениця, урожайність, добрива, доза, білок, «сира» клейковина, сорт,



грунт, сівозміна.

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Article sent: 26/03/2017 of

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j12-021

DOI: 10.21893/2227-6920.2017-12.021

УДК 636.2.082.451:619:615.357

HORMONAL STIMULATION OF SEXUAL FUNCTION ГОРМОНАЛЬНАЯ СТИМУЛЯЦИЯ ПОЛОВОЙ ФУНКЦИИ

c.v.s., doc. Malakhova N.A. / к.в.н., доц. Малахова Н.А.

c.v.s., Lishchuk A.P. / к.в.н., Лищук А.П.

c.b.s., doc. Smagina T.V. / к.б.н., доц. Смагина Т.В.

c.v.s., doc. Kleymyonova N.V. / к.б.н., доц. Клейменова Н.В.

c.b.s., doc. Piskunova O.G. / к.б.н., доц. Пискунова О.Г.

*Orlovsky agrarian University named after N. V. Parahina, Russian Federation, Orel, Generala Rodina 69,
Орловский аграрный университет имени Н.В. Парахина, Орел, ул. Генерала Родина 69*

Abstract. *One of the most important conditions for the restoration and development of dairy farming and increasing its productivity in the Orel region and in the whole Russian Federation is rationally organized reproduction of the herd. It includes a complex of organizational and veterinary activities, which includes proper breeding of cattle, creation the best conditions of feeding, the maintenance and operation of cows, the organization of overhaul of the herd and of artificial insemination, training and skill development of personnel.*

Keywords: *hormonal stimulation, reproduction, estrus, hypofunction of ovaries, hormones, prostaglandins PDF2 α , gonadotropins, ovulation, insemination.*

Intensification of reproduction is a major part of the increasing in milk production, which is the most actual in the period of Russia's WTO accession.

Our researches demonstrate that low insemination of cows in the 1st month after calving on the farms of the Orel region can be explained by abnormal over of the postnatal period in the result of violation of the conditions of keeping, feeding and animal exploitation, as well as the fact that involution of the genital organs of animals in industrial conditions will be completed in 40-60 days after calving.

And, nevertheless, both with industrial, and with the physiological point of view it is necessary to create optimal conditions the successfulinsemination of cows in the 1-st month after calving. During this period the expense of energy of a diet on



lactation are still insignificant, whereas at the age of 2-3-months they sharply increase.

In cases, when the cows don't come into the estrus for 2 or more months after calving, and in order to prevent such situation in highly productive herds it is necessary to stimulate the sexual function with hormonal therapy.

According to the results of our numerous researches the main causes of violation of reproductive function of dairy cows are hypofunction of ovaries and endometritis. Often endometritis are simultaneously combined with ovarian pathology - persistent follicles, persistent yellow body and cysts of the ovary. So of surveyed for three years in highly productive herds 3580 cows with the violation of sexual function in 29% was diagnosed hypofunction of ovaries and in 53,4% -endometritis.

Stimulation will be effective only in the case of a comprehensive, balanced nutrition and, if the cows have fatness within 3 points and above. First of all cows should be investigated rectally in order to determine the status of internal genital organs and to except the gynecological pathology.

As a fact, cows which did not renewed estrus for a long period of time after calving, have no clinical signs of diseases of the reproductive organs, they have a smooth, reduced in size ovaries, that prove the absence of follicles or yellow body; they have an atonic uterus, which not declining during massage. It is a species with overall function.

According to N. Klyuchnikova, M. Klyuchnikov (2005), among the surveyed 14589 heifers 41.1% did not have clinically defined diseases of the reproductive organs. It means that they have functional disorders.

In hypofunction of the part of the cows is manifested estrus and heat period, but fertility is low. The essence of this phenomenon is the lack of ovulatory response of the ovary. Investigation: 1) delay ovulation, 2) absence of ovulation), 3) persistence of the mature follicle and its transition in a thin-walled cyst, 4) a deficiency in the production of estrogen by the tertiary follicle atresia cystic (N.I. Polyantsev, V.V. Podberezny, 2004). Such animals have shortened or elongated sexual cycles and low efficiency of insemination (Table1)

**Table 1.**

Influence of the duration of sexual cycles

Indicators	Duration of the sexual		
	14-17	18-23	24-35
General insemination %	70-78	93-92	80-81
From the 1 st	43-43	61-64	42-45
Index of the insemination	2,8-2,8	1,1-	2,9-

The reaction of animals to the drugs depends on the functional state of the body and the state of the organs of the reproductive system, and also on the conditions of the external environment. That is why the main conditions of the administration of hormonal drugs are individual, strictly differentiated administration, as well as the accounting of evolutionarily developed biological regularities of the sexual function. The injected hormones should model the natural rhythm of the functional activity of the integral system: body-hypothalamus– pituitary body - gonad – uterus.

During each period of reproduction the cascade of hormones of this system function consistently. A cascade of hormones of system: pituitary - gonad-uterus (causes reproductive cycle): Gonadotropin-releasing hormone of the hypothalamus - follicle-stimulating hormone of pituitary - estrogens follicle - luteinizing hormone, concentrating in the pituitary gland and secreted hormone of yellow body (progesterone) - prostaglandins myometrium of the uterus. In the practice of the directed regulation of cattle reproductive rate, 4 groups of drugs are mainly used. group 1 – gonadolibrines (dirigistran, surphagon, fertragil) (surgafon, dirigistran, fertragil) - synthetic analogues of gonadotropin-releasing hormone, GnRH, which functions on the gonads through the activation of the anterior lobe of the pituitary. These drugs accelerate the process of maturing follicles ovulation and luteinization of the walls of follicular cysts. The main administration of them should be directed to the prevention of anovulation, delaying ovulation, increasing insemination and at the therapy of animals with follicular cysts. The injection of drugs of this group with actively functioning of the yellow body contributes to additional release of LH and can be used to reduce early embryonic mortality [A.



Nezhdanov, et al. 2008).

group 2 - pituitary gonadotropins (FSH-super, FSH-p, follitropin) and placental origin (PMSG, follimag, folligon, sergon, horulon.). Placental gonadotropic drugs selected from the blood of pregnant mares (PMSG, follimag, sergon, horulon), have an expressed follicle-stimulating and luteinizing action (they contain both FSH and LH) stimulate the morphogenesis and growth of follicles in any functional state of the gonads (hypothyreosis, the presence of cyclic or persistent yellow body, yellow body pregnancy or cystic formations)). Ovulation occurs only with the injection of placental gonadotropins due to low activity of the yellow body (in hypofunction, the presence of yellow body in a state of involution - after 14-16 days of sexual cycles with follicular cyst). Nature of the morphological changes in the ovaries and their hormonal functions is the same as during spontaneous manifestation of the sexual cycle - i.e. significantly increased allocation at first, testosterone, estrogen, thyroxine, and then the formation of the yellow body of progesterone. When ovarian dysfunction, manifested delay ovulation or anovulation or hypoplasia of the yellow body of the injection of placental gonadotropins also increases the insemination and reduces the embryonic mortality. Administration of gonadotropin-releasing drugs based on SPH on infertility cows with deep depression of function of sexual glands restores sexual function in a large proportion of the animals.. In the presence of functional yellow body or luteal cyst application of placental gonadotropins contraindicated, as it is blocked ovulation.

The administration of purified pituitary follicle-stimulating gonadotropins in cases of ovarian hypofunction is effective for recovery of the reproductive cycle, but for the insemination it is lower than PMSG. When administering this group of hormones, the active follicles growth and the phenomena of the sexual cycle are observed, but the follicles maturing and their ovulation are not always completed. [A. Nezhdanov, et al. 2008]. Hormone-like substances of the 3-rd group - prostaglandin analogues $PGF2\alpha$ - $PGF2\alpha$ (estrofan, magestrofan, ensapost, prosolvin). The most rationally administration of the 3-d group substances when functionally active yellow body or luteal cyst presence in the ovary. After their injection the concentration of



progesterone in the blood reduced to 4.5-8.9 times, and the concentration of estrogen increases to 2.2 times.

Drugs of prostaglandin $F2\alpha$ cause the reverse development not only of the yellow body or luteal cyst, but of other luteal structures of the core substances of the ovaries.

That is why the greatest efficiency in their use can be achieved with a combination of their administration with gonadolibelin of the 1st group and gonadotropins of the 2nd group. Gonadotropins and gonadolibelin are administered after the injection of prostaglandins $F2\alpha$. (A. Nezhdanov, et al. 2008). With ovaries hypofunction the administration of prostaglandin drugs $F2\alpha$ is useless. (A. Nezhdanov, et al. 2008).

Hormones of the 4th group – progestin, produced by luteum, and placenta ($P4$ - progesterone). They support the pregnancy and prevent the maturation of a dominant follicle. In the presence of yellow body the content of progesterone in the blood serum is more than 2 mg/ml. In the absence of yellow body, as well as other lutein structures in the ovary - less than 1 mg/ml. It is a signal to the development of a new wave of follicles, one (rarely 2) evolves in a mature, able of ovulation. When a function and deep ovarian hypofunction the content of progesterone is low, but folliculogenesis is broken. In herds of high-yielding dairy cows the efficiency of the administration of gonadotropins increases if before its injection within a few days injected progesterone. The purpose of hormonal stimulation is insemination of cows at an earlier date after calving. To stimulate and synchronize sexual function cows were developed and widely used several schemes (table. 3). Usually administered intramuscular injections of the hormone in doses that are specified in the instructions for use. Progesterone spirals (CIDR) for a few days is placed in the vagina, or within a few days hormone injected intramuscularly in small doses. The last is less effective and more laborious.

Schemes of treatment of hypofunction and stimulation of estrus (by K.V. Plemyashov et al., 2008). Treatment of hypofunction: 1,3,6,9 days - progesterone 125 mg in/m or 7 days - pessaries with $P4$ in the vagina; simultaneously administered the



course of vitaminization by water-soluble forms A, D, E; 12 day folligon (follimag, sergon) - 3000 units/m. All schemes of hormonal treatments of cows, directed on ovulation and insemination, which include the absence of treatment animal inflammatory processes in the sex organs. That is why first of all we need to organize the prevention and treatment of postparturient complications.

Table 3.

Principles of stimulation of sexual function

Schemes of stimulation	Terms of the insemination after the injection
Presynch: double injection at intervals of 11 - 14 days (PGF2α)	coming to the estrus after the 1st or 2nd injection of hormone, cows and heifers are inseminated after identification of the estrus through 48-96 hours after injection
Ovsynch: Injection of hormone-releasing hormone + after 7 days injection of PGF2α + 2 days re-injection of hormone-releasing hormone (GnRH PGF2α - GnRH)	inseminate through 16-24 hours after the last treatment, without identifying estrus or after identification of estrus
Select Synch: Injection of hormone-releasing hormone + after 7 days injection of PGF2α (GnRH PGF2α)	coming to estrus inseminate within 48-72 hours after the last injection, or after the identification of estrus
Heat Synch: Injection of releasing hormone + after 7 days injection of PGF2α + through 1 day injection of oestradiol-propionate (GnRH - PGF2α ESPE) injection hormone-	inseminate through 48 hours after the last treatment, without identifying estrus, or after identification of a estrus
Cows, who did not come in a estrus after treatment on the 1st scheme after 12 days of process re-releasing hormone and administrate pessaries with 1.9 grams of progesterone in the vagina, which are removed after 7 days + injection of PGF2α + 2 days re-injection of hormone-releasing (GnRH - P4 - PGF2α - GnRH)	inseminate after 16-24 hours after the last treatment, without identifying estrus, or after identification of estrus

Summary and Conclusions. The stimulation of medium productive healthy



well-fed cows begins in the first month after calving, in order to achieve earlier coming of estrus and insemination of cows.

The effectiveness of all measures directed at improving of the reproductive indicators will depend on the compliance of feeding genetic potential of cows on milk productivity. You cannot achieve satisfactory insemination neither spontaneous nor induced estrus, if the identification of cows in estrus is not established

After such a comprehensive treatment increases a percentage coming in estrus cows and efficiency of their insemination in induced estrus to 80%.

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Аннотация.

Одним из важнейших условий восстановления и развития молочного животноводства и повышения его продуктивности в Орловской области и в целом по Российской Федерации является рационально организованное воспроизводство стада. Оно включает комплекс организационных и зооветеринарных мероприятий, куда входят правильное выращивание племенного молодняка, создание оптимальных условий кормления, содержания и эксплуатации коров, организация ремонта стада и искусственного осеменения, подготовка и повышение квалификации кадров.

Ключевые слова: гормональная стимуляция, воспроизводство, половая охота, гипофункция яичников, гормоны, простагландин ПГФ_{2α}, гонадотропины, овуляция, оплодотворяемость.

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Supervisor: с.v.s., doc. Malakhova N.A. / к.в.н., доц. Малахова Н.А.

с.v.s., Lishchuk A.P / к.в.н., Лищук А.П.

с.b.s., doc. Smagina T.V. / к.б.н., доц. Смагина Т.В.

с.v.s., doc. Kleymyonova N.V. / к.б.н., доц. Клейменова Н.В.

с.b.s., doc. Piskunova O.G., / к.б.н., доц. Пискунова О.Г.

Article sent: 28/03/2017



j12-038

DOI: 10.21893/2227-6920.2017-12.038

**THE SHORT-TERM FORECAST OF MITES PRIMARY FOCUS
OLIGONYCHUS UNUNGUIS JACOBI (TROMBIDIFORMES:
TETRANYCHIDAE) IN FOMIN BOTANICAL GARDEN
КРАТКОСРОЧНЫЙ ПРОГНОЗ ОБРАЗОВАНИЯ ПЕРВИЧНЫХ ОЧАГОВ
КЛЕЩА *OLIGONYCHUS UNUNGUIS* JACOBI (TROMBIDIFORMES:
TETRANYCHIDAE) В УСЛОВИЯХ БОТАНИЧЕСКОГО САДА
ИМ. АКАД. А.В. ФОМИНА**

с.а.с., as. prof. Bondareva L.M. / к. с.-х. н., доц. Бондарева Л.М.¹

с.а.с., as. prof. Chumak P.Y / к. с.-х. н Чумак П.Я.²

Kovalchuk V.P. / Ковальчук В.П.²

s. Bondarev B. V. / студ. Бондарев Б. В.¹

¹ *Національний університет біоресурсів і природопользовання України, Київ,
Героев оборони 13, 03041*

*National University of Life and Environmental Sciences of Ukraine., Kyiv,
Heroyiv Oborony 13, 03041*

² *Ботанический сад им. акад. А.В. Фомина Киевского национального университета имени Т.
Шевченко, Киев, С. Петлюры, 1, 01032*

Fomin Botanical garden Kyiv national University Shevchenko, Kyiv, S. Potluri, 1, 01032

*Abstract. The article deals with the harmfulness *Oligonychus ununguis Jacobi* of in the Fomin botanical garden. It is established that between indicators of the SCC and the date of the mass hatching of larvae from eggs there is a fairly close relationship ($R^2 = 0,6058$). It is recommended to use the SCC data to develop the current forecast of the mass revival of tick mites.*

*Key words: *Oligonychus ununguis Jacobi*, distribution, colonization of plants, pest damage, forecast.*

Introduction

Mites of the genus *Oligonychus Berlese* (1886) are phytophagous, some species of plants of the genera *Carpinus* L., *Corylus* L., *Prunus* L., *Quercus* L., but most species of mites of this genus are found on plants of the pine family (Pinaceae). According to Akimov, Zhavnerchik [1] in the Fomin Botanical garden Kyiv national University of Taras Shevchenko on the pine the most common and harmful is the spruce spider mite *Oligonychus ununguis* (Jacobi, 1905).

The species is distributed in the United States, Poland, Georgia, Ukraine, Russia, Latvia, Tajikistan, Kazakhstan and Cuba. According Livshits and Mitrofanov damage coniferous, mainly spruce [3].

The harmfulness of spruce mite in years of mass reproduction is very high. It is



established that excessive settlement of plant mites violated important physiological processes: reduced water-holding capacity, increasing the intensity of transpiration, photosynthesis slows down, disturbed ratio of green and yellow groups of pigments. The result is a reduced growth of shoots, needles remains underdeveloped or turns brown, wither and prematurely fall from the shoots of 3 – 6 years. In the Park, fragile biocenoses, before the advent of natural enemies, there is the death of young trees. So important is the development of the forecast mass hatching of larvae of the phytophage, which has important practical significance.

Material for the study were the fees mites (2012-2016) conducted in the process of regular monitoring of the phytosanitary state of plants of the Botanical garden. To account for the mites used methods of shaking on black paper, as well as direct collection of leaves, needles binocularly under a microscope. Microbert of mites were made according to published methods [1, 4]. Quantitative indicators based on the number of mites from the number of factors were determined by subtracting the average number of individuals of the phytophage on 20 shoots of each species or taxon paved wave plants. Quantitative data were analyzed and computed using the software package Statistica Ph 6.0 Microsoft Excel.

The main text

From the literature [3] it is known that the hatching of the mite's eggs that have overwintered occurs about a month (mid-April to mid-may), post-embryonic development lasts for 18-22 days, and the first adult females appear in late may – early June. So important is the determination of correlations between the beginning of the mass reproduction of the phytophage, the beginning of the growing season and the transition temperature $+10^{\circ}\text{C}$.

Excess constant daily temperature through $+10^{\circ}\text{C}$ during the study period occurred mainly in April and only in 2014 may. The earliest is excess in 2012, there were 14.04, 2013 – 18.04, 2014 – 7.05, 2015, 23.04, and in 2016 – 17.04.

Faster the embryogenesis of the mite passed in 2013 (only 11 days, the sum of effective temperature was 117°C), and the longest - 2016 (47 days, the sum of effective temperatures 118°C). Return average temperature to the threshold of



development mites in the period from the date of transition over $+10^{\circ}\text{C}$ before the mass revival was observed in 2015 for two days (04 – 05.05), and in 2016, as many as three times (22-24.04, 27-29.04 and 19-21.05). In other years of research, the air temperature in this period was up to $+11^{\circ}\text{C}$. The sum of effective temperatures is in the range of 105°C (2012) – 122°C (2016).

To summarize the quantitative characteristics of state of climatic factors at certain critical periods of the life cycle of mites and insects use SCC (hydrothermal coefficient). The definition of SCC for the period of the embryogenesis of the mite showed that the lowest level of this factor observed in 2013, and the highest – 2016

Based on the data of the SCC and observing the development of the mite, the analysis of dependence of occurrence of mites of the first generation from the beginning of plant vegetation *Pseudotsuga menziesii* or transition of daily temperature through $+10^{\circ}\text{C}$.

Long-term observations of Kolisnichenko [2] the vegetation *Pseudotsuga menziesii* starts 05.05 ± 11 days. Blooming plants regularly during the period from 06.05 ± 10.05 8 to ± 9 . So, the flowering of *Pseudotsuga menziesii* fir occurs in quite a wide range. This indicator therefore cannot be the benchmark for determining the period of mass hatching of larvae of spider mites.

Definition of the relationship between the beginning of mass reproduction of spider mites and the sum of temperatures above $+10^{\circ}\text{C}$ during this period showed that a connection between them does not exist ($R^2 = 0,44$).

In our opinion, this may be due to the fact that the longer the lag-period between the start date of mass revival of the mite and the date at which begins the more it happens days with a decrease in temperature below $+10^{\circ}\text{C}$. For example, in 2015 it was observed for two days (04 – 05.05) in 2016, three times (22-24.04, 27-29.04 and 19-21.05). In other years of observations of air temperature in this period was up to $+11^{\circ}\text{C}$.

Determination of the relationship between the start dates of mass emergence of larvae of the mite and SCC (hydrothermal coefficient) showed that the relationship between these parameters ($R^2 = 0,61$) (Fig. 1).

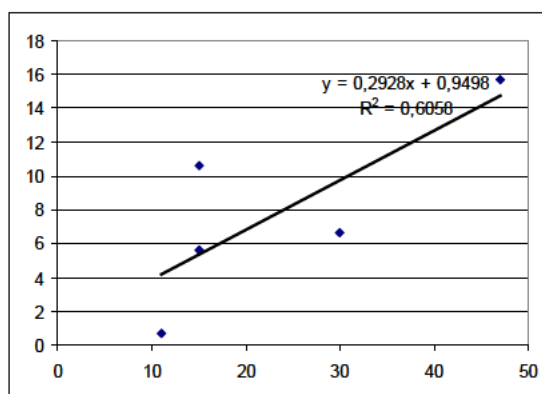


Figure.1. The relationship between the beginning of the mass revival of the mite and gdaterry coefficient at temperatures above +10⁰ C: the abscissa axis (X) is the number of days from +10⁰ C to mass and larvae of spider mites; the axis of ordinates (Y) – hydrothermal coefficient (SCC) (2012 – 2016).

Summary and Conclusions

This analysis suggests that between indicators of the SCC and the date of the mass hatching of larvae from eggs there is a fairly close relationship ($R^2 = 0,6058$). Therefore, to determine the dates the mass appearance of larvae of the spider mite on *Pseudotsuga menziesii* (Mirb.) Franco, you should consider the indicator of the SCC, which determine the amount of precipitation and the sum of temperatures above +10C.

Аннотация.

В статье рассматриваются вопросы вредоносности елового паутинного клеща в условиях ботанического сада им. акад. А.В. Фомина. Установлено, что между показателями ГТК и датой массового отрождения личинок из яиц существует достаточно тесная связь ($R^2 = 0,6058$). Рекомендуется использовать данные ГТК для разработки текущего прогноза массового возрождения личинок клеща.

Ключевые слова: еловый паутинный клещ, распространение, заселение растений, вредоносность, текущий прогноз.

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Supervisor: s.a.s., as. prof. Bondareva L.M.

Article sent: 03/04/2017 of

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**j12-003****DOI: 10.21893/2227-6920.2017-12.003****ORGANIZATIONAL FORMS OF INNOVATION IN AGRICULTURE****ОРГАНИЗАЦИОННЫЕ ФОРМЫ ИННОВАЦИОННОЙ
ДЕЯТЕЛЬНОСТИ В СЕЛЬСКОМ ХОЗЯЙСТВЕ****c.e.s., prof. Gevora Y. I./ к.э.н., проф. Жевора Ю.И.****c.e.s., as. prof. Donetski D. S./ к.э.н., доц. Донецкий Д.С.****c.t.s., as. prof. Pavlyuk R. V./ к.т.н., доц. Павлюк Р.В.***Stavropol state Agrarian University,**Stavropol, street Zootekhnicheskyy, 12, 355017, Russian Federation**Ставропольский государственный аграрный университет,**г. Ставрополь, пер. Зоотехнический, 12, 355017, Российская Федерация*

Considered branch features of innovative process in agriculture. Identifies the main organizational forms of innovative activities and priority areas of entrepreneurship in agriculture.

Key words: organization, form, innovation, agriculture.

The peculiarities of innovative process in agriculture stems from the objective perspective of the industry. The basis of the distinctive features of the industry are natural-biological characteristics of agricultural production. In addition to the sectoral aspects of the innovation process in agriculture should take into account the characteristics of the innovation process. The most simple scheme of the innovation process in General, including in agriculture, can be presented in a logical partition of a single process into separate functional or structural part, which includes fundamental research in agriculture, applied research in agriculture, technology and development in the agricultural sector, pilot production, mass production, implementation of production and the formation of the order for science.

As a common task of all the stages performs processing technology and management information to implement the products of scientific and technical developments in the form of new products, new structures, new techniques, new technological processes and control systems for agricultural production.

Due to the focus structure of the innovation process is systemic in nature.



Innovative stages can produce organizationally separate functional units; if their interaction does not create new results, innovation does not reach the goal.

The result of the innovation process and related innovation policy in agriculture there is a significant modernization of production on the basis of scientific achievements, obtained directly in the field of science – in institutions and other groups that produce scientific products.

For agriculture is highly characterized by the diversity of organizational forms of innovative process, which in turn determines the diversity in the structures of formation, as well as the goals and mechanism of their functioning.

The main organizational forms of innovative process in agriculture are: research-and-production Association, scientific-production (production) system; small innovative firms; engineering firms; centers of innovation development; information and Advisory centres; agrotechnoparks formation etc.

The diversity of these forms is determined by the purpose and mechanism of their functioning. The most common model of scientific and innovative groups in the agricultural sector is research and production systems and enterprises. In the conditions of transition of economy to market relations scientific and innovative agricultural sector was forced to restructure and improve.

In many regions of the country, since the 90-ies of XX century, scientific and industrial system of various specializations transformirovalsya in small companies, innovation firms and other organizational forms that have much greater autonomy in economic and financial activities. Therefore, we focus on the more modern and popular forms of organization of innovative activities.

A complex solution of many scientific-technical and production problems, including at the interface of related industries, provided by engineering companies. Their main functions are the provision on the basis of a contract of property or certain types of engineering services related to research, design, construction, commissioning, development of new technological processes at the enterprise of the customer, improvement of existing production processes, introduction of new products into production.



Engineering firms are linking all the stages of the innovation process, ensuring its consistency and continuity, minimizing the risks and costs of economic resources, as well as losses at the joints of the individual stages of innovation. As a result of external engineering is the export of R & d that contributes to the international division of intellectual labor and foreign exchange innovations.

Centers of innovative development spetsializiruyutsya on the provision of information and mediation services in scientific-technical and innovation field and in most cases are regional in nature activity. Such structures are formed under the auspices of the regional authorities and have budget financing, realizing, thus, the regional innovative development concept.

The main objectives of the center are to stimulate innovation in the region through constant monitoring of markets, innovation and investment, as well as providing information and expertise to the innovation process.

The development of market relations in agricultural science requires a search for alternative and effective ways of implementation in the agricultural production of the results of research, developmental and technological developments. Therefore, one of the main areas that contribute to the introduction of scientific achievements into production and the efficiency of the innovation process is Informatization.

Currently, information and counselling centres have been established in many regions of the Russian Federation, including in the Stavropol region. Part of their funding is provided by local funds and allocated by the Ministry of agriculture of the Russian Federation.

The analysis of the situation shows that because of the unavailability of market structures for the perception and development of innovation, sticking to only the simplest and commercially win-win technology, agricultural production is subject to the "technological inflation", accompanied by the reduction of the technical and technological level. In the conditions of market relations to develop any innovation, in the whole APK, currently, is almost impossible.

Therefore, the so-called point appropriate technology innovation: in specific areas to focus innovation, to create "growth points" , database testing new



technologies. As such innovative polygons can be agrotechnopark and agrotechnology, where you can fully use the ideas and results of scientific research in the field of production of organic food. The distinctive feature of such innovative projects derives from the nature of the innovation process: the development, pilot testing, implementation and spread of innovation.

Objective assessment of the work agrotechnoparks groups shows that they are due to the nature of the functioning is able to remove barriers between academic, industry and University science, to provide a deeper integration with specific production.

However, not so much the creation or emergence of innovation as their diffusion is the main goal of the innovation process; therefore there is an urgent need for enterprises to access advanced technologies.

There is an objective necessity of involvement in the innovation development process of such elements as technology transfer, through which is the connection of science and production.

Infrastructure of technology transfer becomes an important element in enhancing the impact of science, the integration of its main links with industry. Moreover, it creates favorable conditions for formation of innovation clusters, despite the objective economic difficulties.

Of course, for effective operation it is necessary to create specialized structures that are bound to all stages of the innovation process. Such structures can act as centres of commercialization and business incubators.

Centers of commercialization are subdivisions of universities and scientific organizations. They evaluate the commercial potential of the development, form a strategy for its commercialization strategy for the protection of intellectual property sell intellectual product is beneficial for University or research Institute. Business incubator are one of the forms of commercialization and in fact perform the role of a starting enterprise.

Currently in Russia the development of the strategy aimed at development of innovative activities set out in a number of priority tasks of economic policy. In this



regard, the experience of developed countries in shaping the innovation environment and stimulation of innovative activity can serve as a Supplement in the development of programs of innovative development of economy and formation of optimal variant of innovation strategy.

The state policy of the developed countries is based on the implementation of the complex legislative and organizational measures aimed at creating and maintaining the country's "innovation climate" conducive to the realization of innovations with economic, logistical, organizational, legal and moral conditions.

Special place in system of direct measures of state influence on innovative business is the promotion of the development of Technopark structures. In the 80-ies of XX century in the Western European countries great progress has been various kinds of scientific and production complexes, innovation centers, scientific and technological parks, "incubators of enterprises of high technologies".

The General trend in recent decades in developed countries is to reduce direct government involvement in the innovation process. However, the state uses a wider range of indirect measures of stimulation of innovative activity through tax incentives, subsidized loans, targeted to support small and medium innovative business, formation of innovative infrastructure and institutions.

Currently in Western Europe the state plays a significant role in the creation of mixed public-private information infrastructure for innovative business. Essential elements of such infrastructure are an independent organization for applied research, scientific parks, the introduction of new technological standards, cluster projects, and regional centers of commercial innovation, able to implement appropriate marketing activities.

Based on the experience of developed countries it is possible to allocate following directions of increase of business innovation activity in agriculture: development of a long-term program for scientific and technological development of national economy by sectors; the establishment of an effective financial mechanism and economic incentives of innovative activity in agrarian sector of economy; creation of structural units of the state authorities performing the functions of



information collection, promotion of scientific research; attracting private and foreign investment (in the form of grants) to Finance research and development activities; comprehensive state support of small and medium innovation business; reduction of administrative barriers; promoting the active procurement of R & d results abroad; development of system of insurance of investments in R & d; creation of innovation infrastructure (information and Advisory service, agrotechnoparks, etc.); improving the system of education and training, is ready to innovations and able to implement the principles and objectives of modern innovation strategy of the country.

Thus, the economic aspects of organization innovative activities in agriculture are as follows.

The interaction of participants in the innovation process has certain characteristics, expressed in the specifics of the industry and the innovation cycle. These features are natural-biological nature, which determines the technical and technological, organizational and socio-economic structure of the industry. The essence of the innovation process is defined in six stages, the effectiveness of each of which is defined at the final stage, when the costs of innovation pay off, which leads to the beginning of a new cycle. The cyclicity is caused by objective diversity of market linkages, which are manifested at every stage as the interaction of individual units of infrastructure.

The final stage of innovation is the transfer and commercialization of technologies and is supported by the presence of certain structures. The system of financing of investment projects provides incentives for innovative activity in agriculture.

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Аннотация. Рассмотрены отраслевые особенности инновационного процесса в сельском хозяйстве. Определены основные организационные формы инновационной деятельности и приоритетные направления повышения предпринимательской активности в сельском хозяйстве.

Введение. Особенности инновационного процесса в сельском хозяйстве вытекает из объективных аспектов отрасли. В основе отличительных черт отрасли лежат природно-биологические особенности сельскохозяйственного производства. Помимо отраслевых аспектов инновационного процесса в АПК необходимо учитывать особенности содержания самого инновационного процесса.

Ключевые слова: организация, формы, инновации, сельское хозяйство.

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Supervisor: prof. Gevora Y. I.



j12-067

DOI: 10.21893/2227-6920.2017-12.067

EFFICIENCY OF BIOPREPARATION APPLICATION AND**FERTILIZERS FOR SPRING WHEAT****ЭФФЕКТИВНОСТЬ ПРИМЕНЕНИЯ БИОПРЕПАРАТОВ И****УДОБРЕНИЙ НА ЯРОВОЙ ПШЕНИЦЕ****Nikitin S.N. / Никитин С.Н.**

Ulyanovsk Research Institute of Agriculture, Ulyanovsk region, Ulyanovsk district, the settlement of Timiryazevsky, Institutskaya St. 19, 433315

Ульяновский научно-исследовательский институт сельского хозяйства, Ульяновская область, Ульяновский район, п. Тимирязевский, ул. Институтская, 19, 433315

Abstract. High efficiency of biopreparations: rizoagrin, flavobacterin, azorozin, agrophil, mizorin and extrasol for pre-sowing seed treatment has been proved in the technology of cultivating spring wheat with their application both in a pure form and in contrast to mineral fertilizers. The grain yield gain without the use of any fertilizers was 0,1 – 0,49 t/ha (4 – 18 %), in contrast to N30P30K30 – 0,59 – 0,81 t/ha (21 – 29 %).

Keywords: biopreparations, mineral fertilizers, spring wheat, yield.

Аннотация. В работе показана высокая эффективность биопрепаратов: ризоагрин, флавобактерин, азорозин, агрофил, мизорин и экстрасол для предпосевной обработки семян. Была доказана эффективность их применения в технологии выращивания яровой пшеницы как в чистом виде, так и в сочетании с минеральными удобрениями. Урожайность зерна при применении биопрепаратов составляло 0,1 – 0,49 т/га (4 – 18 %), на фоне N30P30K30 – 0,59 – 0,81 т/га (21 – 29 %).

Ключевые слова: биопрепараты, минеральные удобрения, яровая пшеница, урожайность.

Introduction. Soil is a unique polydisperse and multicomponent system in its physical and chemical properties that represents an ideal environment for the existence of a great number of microorganisms which are various in their needs. In



any clod of the soil there are aerobic, anaerobic, thermophilic and psychrophiles, acidophile and alkalophilic bacteria, autotrophic and heterotrophic, eubacteria, prokaryotes and eukaryotes.

Contemporary natural science recognizes a special role of the bacteria living in the soil in supporting stability both of ground ecosystems and biosphere on the whole. The activity of a person contributes to the intensification of biogeochemical functions causing by this a shift of homeostasis existing in nature. That is why it is not accidental that in the last years an interest to new non-traditional components of farming has been growing quickly the vital element of which is a widespread use of biopreparations directed towards the regulation of activity of some functional bacteria groups, first of all, nitrogen-fixing ones. The circulation of nitrogen in nature is carried out by bacteria and microorganisms only and microbiologic fixation of nitrogen played an important role in creation of the nitrogen status of biosphere and maintaining it for several billions of years [1].

In this connection it is worth reminding that until recent times the capability of fixing molecular nitrogen has been ascribed to a small number of highly specialized bacteria (bulb bacteria, azotobacter, some species of bacilli). By present time the nitrogen-fixing activity has been found practically in species of all bacteria groups: autotrophic and heterotrophic, spore and non-spore, in eubacteria and archaeons [1].

The management of microbiological processes of atmospheric nitrogen fixation for the purpose of preserving the soil fertility became one of the most important theoretical and practical objectives of soil science, agrochemistry and farming. In this connection the most important technique is the introduction of definite useful microorganisms in agrocenoses [2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12]. It is believed that biological nitrogen comes into the soil by means of pre-sowing seed treatment with diazotrophic preparations in the amount of 20 – 107 kg/ha depending on the identification method, region, soil and climatic conditions, type of agrocenosis and others [13, 14].

Soil microorganisms (first of all, microscopic fungi and bacteria) are the main agents converting poorly soluble phosphorus compounds into available forms. That is



why the use of phosphate-mobilizing bacteria in the composition of bacterial fertilizers to improve plant nutrition is an effective technique. The effect exerted by phosphate mobilizing microflora on the plant is determined both by the increase of phosphorus available for plants and forming physiologically active substances by it [15].

The analysis of contemporary scientific literature on the study of biopreparations in sown crops shows a great prospect and predetermines the necessity of applying each of them in definite soil and climatic conditions since they identify to a greater extent the efficiency of any techniques of raising the crop yield. The above mentioned ascertained the purpose of our studies – to investigate the efficiency of biopreparations offered to agricultural producers at present for the use in the system of fertilization of one of the main food crops of the Volga region – spring wheat.

Objects, conditions and methods of research. The objects of the study were: biopreparations - rizoagrin, flavobacterin, azorin, agrophyl, mizorin and extrasol; mineral fertilizers – ammonium saltpeter, double granulated superphosphate and chloric potassium; a crop – spring wheat of the variety “Zemlyachka”; the soil of the experimental plot – black soil slightly leached hard clayloam with a humus content in the arable layer of 5,65 %, total nitrogen 0,26 %, mobile compounds of phosphorus and potassium 215 and 103 mg/kg of the soil respectively, pH_{KCl} 6,6 units. The experimental design: 1 variant – control, 2. Rizoagrin, 3. Flavobacterin, 4. Azorizin, 5. Agrophyl, 6. Mizorin, 7. Extrasol, 8. N30P30K30 (NPK), 9. NPK + rizoagrin, 10. NPK + flavobacterin, 11. NPK + azorizin, 12. NPK + agrophyl, 13. NPK + mizorin, 14. NPK + extrasol. Mineral fertilizers in the form Naa, РСд и Kx were applied for pre-sowing seedbed cultivation, seeds were treated with biopreparations before sowing in doses of 600 gr for 1 tonne of seeds with the use of adhesives. The sowing area of the plot was 59,4 m² (1,65*36), registration plot was 49,5 (1,65*30), the location was randomized. Field and lab studies were conducted in conformity with methodological requirements and state standards. In the years of doing experiments the weather conditions of vegetation periods on the whole were favorable for plant development and yield formation.



Investigation results. The yield values of spring wheat have been given in table 1 depending on the application of biopreparations in the technology of its cultivation both in a pure form and in contrast to mineral fertilizers.

While analyzing the data of the table first of all it makes itself conspicuous that a number of biopreparations in cultivating spring wheat on typical black soil of the Middle Volga region make it possible to form the grain yield comparable with the yield of the use of medium doses of mineral fertilizers. For example, rizoagrin and flavobacterin in efficiency exceed the variant with soil application of N30P30K30, and the yield gain from the use of extrasol for pre-sowing seed treatment at the level of the mineral fertilization degree. The latter, without any doubt, owes its marked nitrogen fixation capability of these biopreparations, and in relation to rizoagrin – much wider range of bacteria strains present in it (*Arthrobacter mysorens* 7, *Bacillus subtilis*, *Agrobacterium radiobacter* 204, *Azomonas agilis* 12, *Agrobacterium radiobacter* 10, *Azospirillum lipoferum* 137).

Azorozin, agrophyl and mizorin are less efficient in this relation. However the use of them in the background of mineral fertilizers sharply increases their efficiency: the grain yield gain in all the variants practically doubles. The inoculation of seeds with various biopreparations correspondingly increases the cost-repayment of mineral fertilizers with the grain yield gain from 3,6 to 6,6 – 8,4 kg/kg.

Consequently, despite the opinion of a number of authors [16, 17] that the molecular nitrogen assimilation is inhibited in the presence of certain amounts of nitrogen and seed inoculation efficiency due to this decreases. Small starting doses of easily available nitrogen seem to be required for the formation of a powerful photosynthetic potential in plants and stimulation of the nitrogen-fixing bacteria development.

Along with the rise of the main produce yield the application of mineral fertilizers and biopreparations contributed to an increase of the straw harvest the weight of which in the background of applying NPK on average in all variants was 3,93 t/ha, and with application of N30P30K30 and biopreparation's use it rose up to 4,29 t/ha, or by 1,1 times. According to the action efficiency on the straw weight on



both fertilization patterns the tested biopreparations were practically equal. Biopreparations did not have any substantial effect on the value of economic coefficient that shows a grain share in the total biological yield (grain + straw), which was 0,42 – 0,45 on both patterns.

Table 1

**Efficiency of biopreparation application and fertilizers for spring wheat
(on average for 3 years)**

№	Variant	Grain yield, t/ha	Yield gain		Cost-repayment of 1 kg NPK grain, kg / kg	Straw weight, t/ha	Economic coefficient
			t/ha	%			
1	Control	2,75	-	-	-	3,68	0,43
2	Rizoagrin	3,24	0,49	18	-	4,10	0,44
3	Flavobacterin	3,11	0,36	13	-	3,95	0,44
4	Azorizin	2,85	0,10	4	-	3,68	0,44
5	Agrophil	2,96	0,21	8	-	4,02	0,42
6	Mizorin	2,98	0,23	8	-	3,96	0,43
7	Extrasol	3,08	0,33	12	-	4,12	0,43
8	N30P30K30	3,07	0,32/-	12/-	3,6	4,15	0,43
9	NPK + Rizoagrin	3,43	*0,68/ 0,36	25/ 12	7,6	4,28	0,44
10	NPK + Flavobacterin	3,45	0,70/ 0,38	25/ 12	7,8	4,33	0,44
11	NPK + Azorin	3,51	0,76/ 0,44	28/ 14	8,4	4,34	0,45
12	NPK + Agrophil	3,56	0,81/ 0,49	29/ 16	7,4	4,41	0,45
13	NPK + Mizorin	3,34	0,59/ 0,27	21/ 9	6,6	4,22	0,44
14	NPK + Extrasol	3,46	0,71/ 0,39	26/ 13	7,9	4,33	0,44

* – numerator in relation to control, denominator – to NPK

LED_{0,5} of grain: variant – 0,16; biopreparation – 0,06; fertilizer – 0,11; interaction – 0,16 t/ha; P1% – 1,73.

A sudden increase of the spring wheat yield when using biopreparations in contrast to mineral fertilizers (by 0,59 – 0,81 t/ha in relation to absolute control) is probably associated with a considerable rise of coefficients of nutritional elements used from them and the data of table 2 testify to it.

With application of N30P30K30 the coefficient of using nitrogen was 31 %, phosphorus and potassium – 23 %. With application of rizoagrin, flavobacterin and azorizin the coefficient of using nitrogen increased up to 41 – 51 %. While



calculating the coefficients of the nutrition elements' use from fertilizers in relation to the variant without their application the value of coefficients rose reaching 70 – 75 % in nitrogen, 25 – 36 % in phosphorus and 30 – 39 % in potassium.

Table 2

Coefficients of the nutrition elements' use by spring wheat from fertilizers when using biopreparations, % (average for three years)

№	Biopreparation	To control (without a biopreparation)			To the fertilization with a biopreparation		
		N	P ₂ O ₅	K ₂ O	N	P ₂ O ₅	K ₂ O
1	Control	-	-	-	31	23	23
2	Rizoagrín	75	36	39	50	21	24
3	Flavobacterin	70	36	35	41	14	12
4	Azorizin	66	25	30	51	23	15
5	Agrophil	50	39	36	26	28	26
6	Mizorin	75	23	36	32	6	28
7	Extrasol	52	28	38	15	6	15

Thus, the application of biopreparations for inoculating spring wheat seeds makes it possible to increase considerably coefficients of using nitrogen, phosphorus and potassium from mineral fertilizers. It is more significant that the rise of coefficients in nitrogen takes place from rizoagrín, flavobacterin, mizorin and azorizin; in phosphorus from rizoagrín, flavobacterin and agrophil.

Conclusions. Thus the use of biopreparations: rizoagrín, flavobacterin, and extrasol for pre-sowing seed treatment of spring winter makes it possible to form the yielding capacity of grain comparable with the application of average doses of nitrogenous, phosphorus and potassium fertilizers (N30P30K30). The efficiency of all the studied preparations increases sharply when they are used in contrast to mineral fertilizers. In view of this the grain yield in relation to the control group increases by 21-29%, to mineral fertilizers by 9 – 16 %; cost –repayment of 1 kg of fertilizers with grain rises from 3,6 kg to 8,4 kg/kg.

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Article sent: 30/01/2017 of

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j12-068

DOI: 10.21893/2227-6920.2017-12.068

UDC 631.674.6

EFFICIENCY OF WATER TREATMENT FACILITIES ON THE DRIP IRRIGATION SYSTEMS

ЕФЕКТИВНІСТЬ ЗАСОБІВ ВОДОПІДГОТОВКИ В СИСТЕМАХ КРАПЛИННОГО ЗРОШЕННЯ

Usaty S.V., Usata L.G. / Усатий С.В., Усата Л.Г.

Institute of Water Problems and Land Reclamation of NAAS,

Kyiv, Vasylkivs'ka str. 37, 03022

Інститут водних проблем і меліорації НААН,

Київ, Васильківська 37, 03022

Abstract. The article deals with the quality issues of water treatment facilities on the drip irrigation systems. The results of the field studies of the efficiency of different filtration plant units that may provide reducing the content of suspended particles in water are given. The periods of inefficient operation of some water treatment facilities that may cause deteriorating of water quality and changes of design regimes of drip irrigation were determined.

Keywords: drip irrigation, water treatment facilities, content of suspended particles, efficiency.

Анотація. В роботі розглянуто питання якості водопідготовки в системах краплинного зрошення. Представлено результати польових досліджень щодо ефективності різних фільтростанцій у зниженні вмісту завислих часток у воді. Встановлено періоди з неефективною роботою деяких із засобів водопідготовки, під час яких погіршилася якість води та змінилися проектні режими краплинного зрошення.

Ключові слова: краплинне зрошення, засоби водопідготовки, вміст завислих часток, ефективність.

Introduction. Nowadays the question of improving the quality of irrigation water is important because the quality of water used for irrigation of crops in Ukraine



is satisfactory. It was established that the water most of the sources in Mykolaiv, Kherson, Odessa, Vinnitsa and Kyiv regions do not meet the requirements of ISO 2730:2015, ISO 7286:2012 and ISO 7591:2014 for its safe use in the chain "soil-plant-irrigation network" [1-3]. The technological level of modern drip irrigation systems claims the increased requirements for water quality. Under those conditions each parameter of water should be recognized and properly evaluated to ensure reliable operation of drip irrigation system during the watering.

The poor water quality requires an application of special water treatment facilities. To implement water treatment facilities gravel-sand, disk, automatic disk, filter washer, automatic filter washer and other filtration plant units are used [4-5]. These tools are designed to remove organic and mechanical particles, which cause damaging of the component of drip irrigation systems. However, the degree of purification of water in filtration plant unit may be changed and, as proven by our research [1], may lead to the secondary water pollution.

Literature review. The water treatment facility (filtration plant unit) is one of the most important components of the drip irrigation system, since they are determined the reliability and uniformity of the operation of drip water outlets. The importance of proper water treatment quality for drip irrigation is confirmed by numbers of scientific researches and developments devoted to the problem of accelerating the processes of water purification by water treatment technical means. The different type of water treatment means were developed and implemented by the experts from Israel, Greece, Italy, USA, Turkey, Ukraine and others. Among them the most popular in our country are the following products: «AMIAD» (Israel), «YAMIT» (Israel), «AZUD» (Spain), "NETAFIM" (Israel), «IRRITEC "(Italy)," PARAPLAST "(Greece)," EURODRIP "(Greece)," ROSTA "(Ukraine)," TECHNOSERVICE" (Ukraine) and others.

The scientists [4-7] have found that the reliability of the operation of water outlets on the drip irrigation system is achieved under conditions when filters provide transportation of particle with sizes not more than 1/10 of the smallest passage of the dropper. The composition of filters is determined by the degree of water pollution by



mechanical impurities, hydrobionts and salts of chemical elements.

The scientific team of the Institute of Water Problems and Land Reclamation NAAS [8] has recognized that biological (biotic) contamination created by bacteria, fungi and microscopic hydrobionts (phyto and zooplankton) is most dangerous pollution on the drip irrigation systems. Mentioned above pollutants pass through the water treatment system and under favorable conditions (high temperature, availability of oxygen, nitrogen, phosphorus, organic matter, etc.) are able to rapidly multiply.

Input data and methods. Our studies were conducted on four seasonally fixed drip irrigation systems of tomatoes with different types of filtration plants. The water for irrigation was taken from Krasnoznam`yansky irrigation canal (vil. Novovolodymyrivka, Kherson region) and from Ingulets irrigation system (vil. Mykolayivske, Snigurivka, Gorokhovske, Mykolaiv region). On the drip irrigation systems the efficiency of the of mesh automatic filter «Filtomat», disk automatic filtration plant «Automatic Rotodisk» and gravel-sand disk filtration plant «DROP» with system of hand filter unloading were studied. The samples of irrigation water were taken according to the developed scheme (methodology): at intake (before filters), after filtration plant (after the filters), after additional filtration, as well as directly from the main and distribution pipes. The water quality and its suitability for drip irrigation was determined by agronomic, environmental and technical criteria in accordance with ISO 2730:2015, ISO 7286:2012 and ISO 7591:2014.

Results. Discussion and Analysis. The research has established that hydrochemical and hydrobiological parameters of the water during irrigation period on a "water intake structure-filtration plant unit-main pipe-dripper line" are very variable and unstable. The composition of water varies quite widely and in some periods (June-July) did not meet the requirements of ISO 2730:2015, ISO 7286:2012 and ISO 7591:2014 for water use in the chain "soil-plant-irrigation network". The most dangerous components of irrigation water for the chain were the increased toxic alkalinity, pH, concentration of toxic ions, alkalinity from the normal carbonate, the ratio of the concentration of the magnesium cation to the concentration of calcium cations, high iron and nitrogen content, high total salt content, increased the content

of suspended solids of organic origin.

It was found that filtration plant units, which are widely used on the drip irrigation systems, have different ability to reduce the content of suspended particles in the irrigation water from surface sources (Fig. 1).

The best result of water treatment was performed by the disk gravel-sand filtration plant with system of hand filter unloading with water from the Ingulets irrigation system. This filtration plant has reduced the content of suspended particles in water by 30,0 %. For the sustainable functioning of the drip irrigation system with design parameters this figure must be increased. For those purposes the increasing of the numbers of filter flushing in 2 times is recommended.

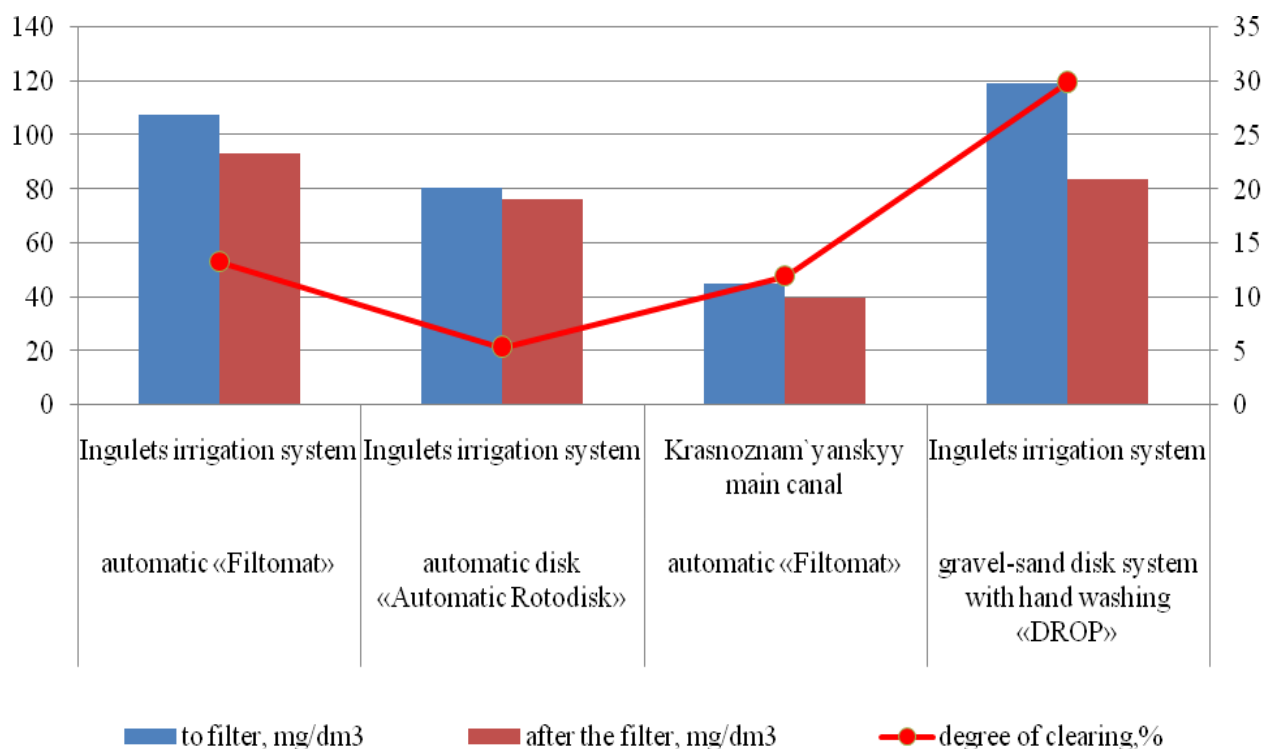


Fig. 1 The reduction of suspended particles in the irrigation water due to the filtration plant unit

The mesh automatic filter «Filtomat» (Ingulets irrigation system) detained 13,28 % of suspended particles. The efficiency of the mesh automatic filtration plant «Filtomat» (water from Krasnoznam`yansky channel was used) was 11,92 %. To

improve the efficiency of the filters is necessary to increase the numbers of automatic flushing in 2-3 times.

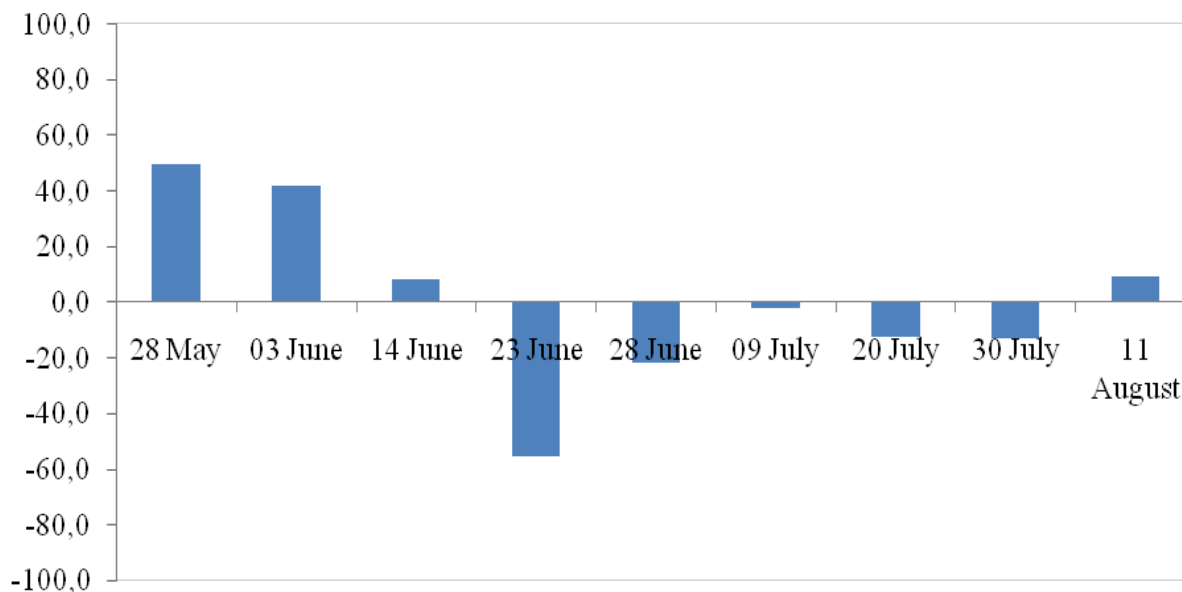


Fig. 2 Dynamics of the efficiency (%) of disk automatic filtration plant «Automatic Rotodisk» to reduce the content of suspended particles in the irrigation water of Ingulets irrigation system

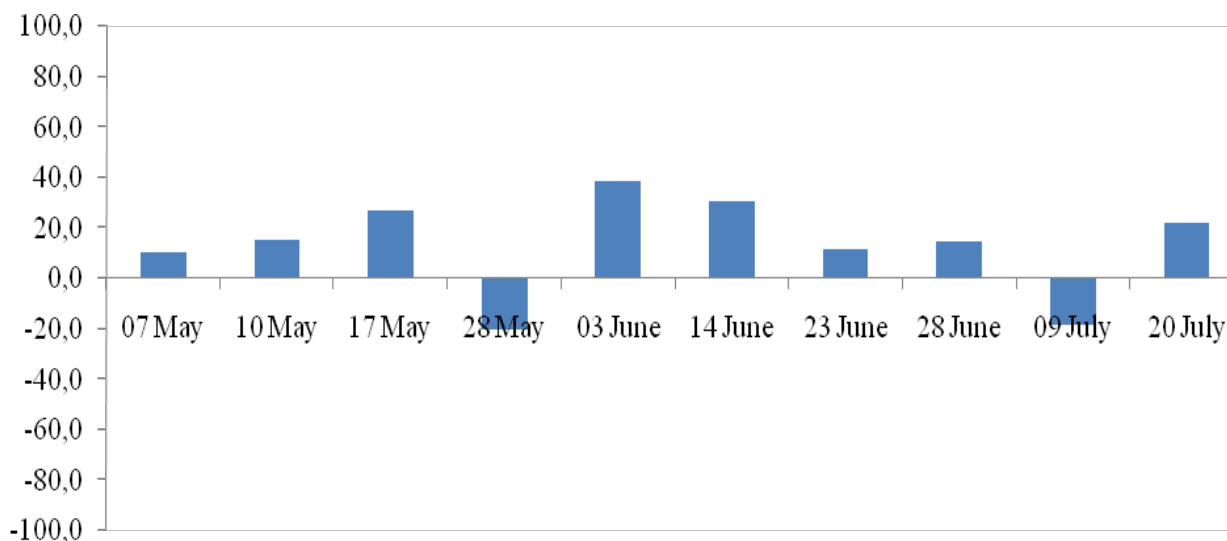


Fig. 3 Dynamics of the efficiency (%) of mesh automatic filter «Filtomat» to reduce the content of suspended particles in the irrigation water of Ingulets irrigation system



The lowest degree of purification was observed on the automatic disk filtration plant «Automatic Rotodisk» - 5,34 %. It is recommended to increase the degree of water purification by means of the additional automatic flushing.

The dynamics of the efficiency of the different filtration plants were determined during the irrigation period. The results of the efficiency of the different filtration plants during watering are presented in figures 2-5. The value of "+" indicates the effective operation of water treatment facilities, "-" - on ineffective.

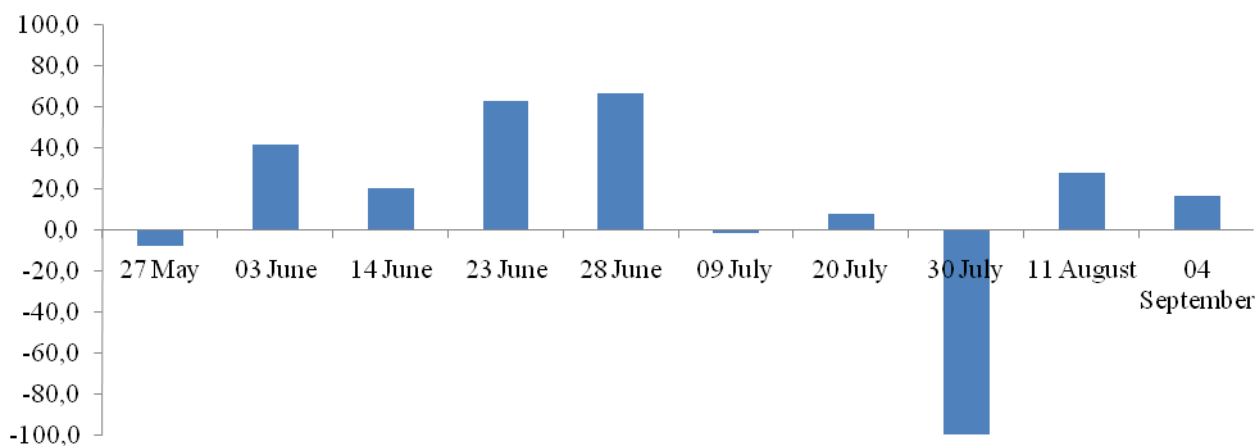


Fig. 4 Dynamics of the efficiency (%) of disk gravel-sand filtration plant with system of hand filter unloading «DROP» to reduce the content of suspended particles in the irrigation water of Ingulets irrigation system

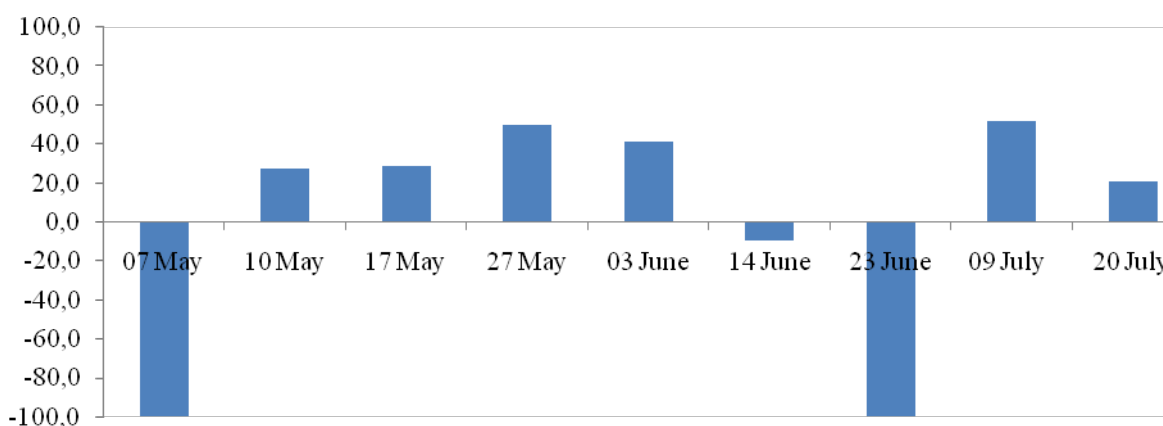


Fig. 5 Dynamics of the efficiency (%) of mesh automatic filter «Filtomat» to reduce the content of suspended particles in the irrigation water of the main Krasnoznam`yansky channel



Conclusion and recommendations. The capacity of the filtration plant unit to reduce the content of suspended particles in irrigation water from Krasnoznan`yansky irrigation channel and channels of Ingulets irrigation system was determined. The best results of water treatment function (among four systems) were observed on the disk gravel-sand filtration plant with system of hand filter unloading «DROP». The lowest efficiency was observed under operation of disk automatic filtration plant «Automatic Rotodisk». The mesh automatic filter «Filtomat» have detained only 11,92-13,28 % from the total amount of suspended particles. The efficiency of water treatment facilities depends not only on the quality of water and the proper selection of the filtration plant, but also on its installing and maintenance.

The researches have proved that without proper maintenance of the drip irrigation system and timely flushing of the irrigation network with a view of ensuring the functioning of the systems with design parameters any technological schemes and methods of irrigation water treatment can not be effective.

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The article sent: 23.12.2016 p.

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TECHNICAL SCIENCES

j12-010

DOI: 10.21893/2227-6920.2017-12.010

УДК 614.87:331.464.1

**DEFINITION OF FUNCTIONING INDICATORS OF THE SAFETY
MANAGEMENT SYSTEM IN EMERGENCY SITUATIONS
ВИЗНАЧЕННЯ ПОКАЗНИКІВ ФУНКЦІОНУВАННЯ СИСТЕМИ
УПРАВЛІННЯ БЕЗПЕКОЮ У НАДЗВИЧАЙНИХ СИТУАЦІЯХ**

**Volodchenkova N. ¹, Hivrich O. ², Labzhynska M. ¹ /
Володченко Н.В. ¹, Хиврич О.В. ², Лабжинська М.Ю. ¹**

¹ National University of Food Technologies, Kiev, Ukraine

²The National Defence University of Ukraine named after Ivan Cherniakhovskyi, Kyiv, Ukraine

¹Національний університет харчових технологій, Київ, Україна

²Національний університет оборони України ім. І.Черняхівського, Київ, Україна

Abstract. *The sources, that carrier of various hazards are natural processes and phenomena, technogenic environment, and human activities (human factor). When hazards identifying that were in finding type of danger and establishing its characteristics, usually based on the principle "everything was effects on everything", that danger may be all living and a lifeless, but also can be subject to risk all the living and the lifeless. The process of identification is needed to develop the measures for the organization and the effective elimination of the consequences, especially for the prevention of the accidents in the industry enterprises.*

The aim of the work: to develop a method of the safety management of industrial enterprise (object) in emergency situations to prevent accidents both at work and for people was living close to industrial objects.

Have been determined the quantitative evaluation indicators of the safety management system of industrial enterprise (object) emergency and criteria of regarding the level of functioning efficiency of the system.

Keywords: *protection, emergency situation, safety, management efficiency.*

Анотація. *Джерелами, тобто носіями різноманітних небезпек є природні*



процеси і явища, техногенне середовище, а також діяльність людини (людський фактор). При ідентифікації небезпек, тобто при знаходженні типу небезпеки та встановленні її характеристик, звичайно виходять з принципу “все впливає на все”, тобто джерелом небезпеки може бути все живе й неживе, а підлягати небезпеці також може все живе й неживе. При цьому процес ідентифікації необхідний для розробки заходів щодо організації і здійснення ефективної ліквідації відповідних наслідків, особливо для попередження нещасних випадків на промислових підприємствах.

В представленій роботі визначено показники кількісного оцінювання системи управління безпекою промислового підприємства (об’єкта) у надзвичайних ситуаціях та критерію щодо рівня ефективності функціонування цієї системи.

Метою дослідження є розроблення методики управління безпекою промислового підприємства (об’єкта) при виникненні надзвичайних ситуацій з метою попередження нещасних випадків, як на виробництві, так і для населення, що мешкає поруч з промисловими об’єктами.

Ключові слова: захист, надзвичайна ситуація, безпека, ефективність управління.

Introduction. To evaluate the contribution of the safety management system of industrial enterprise (object) in emergency situations of different character must have a method, with which it is possible not only assess the degree of functioning of the management system at the liquidation of consequences of emergency situations of different character, but to substantiate the complex recommendations for its improvement.

In addition, the development of appropriate methods is required to solve the following tasks:

- at first, identify the conformity of functioning of the safety management system of industrial enterprise (object) current requirements that apply for the work of management at liquidation of consequences emergencies;
- the second, determine the impact of components of the safety management



system of industrial enterprise (object) on the efficiency of the tasks faced by operative reacting during the liquidation of emergencies consequences;

- third, before carrying out actions which aimed at improving of the safety management system of industrial enterprise (object) to evaluate and predict the contribution to improve its functioning.

Basic research materials: Evaluation of the efficiency of the safety management system of industrial enterprise (object) is carried out by the method of forecasting when the aim is to get a priori aims performance indicators. This problem is solved by mathematical modeling, in which are obtained both are evaluating the effectiveness of the management authorities and tools, as well as evaluating the impact the safety management system of industrial enterprise (object) on the effectiveness of its forces and means (E_R^{SIO}) [1, 2, 5].

Research has established that the share of the effectiveness of application of safety forces and means of the industrial enterprise (object) account for its management system and the rest – to other subsystems. The effectiveness of operative reaction of means can be defined according to the formula:

$$E_R^{SIO} = f(E^{SIO}, T^{SIO}, M^{SIO}), \quad (1)$$

where E_R^{SIO} – the potential of existing of safety means of industrial enterprise (object) to solve problems in daily functioning mode; T^{SIO} – indicator of the efficiency of the safety system of industrial enterprises (object) in emergency mode; M^{SIO} – indicator of the efficiency of the safety management system of industrial enterprise (object) in emergency mode.

Because the only article examines the safety management system of industrial enterprise (object), it can be assumed that the efficiency of its subsystems during elimination the emergency consequences and existing means capabilities to solve their tasks are taken as they are [3, 4]. That:

$$E_R^{SIO} = E_I^{SIO} \cdot (0,67 + 0,33 \cdot M^{SIO}), \quad (2)$$

where 0,67 – the destiny of impact of the ensure subsystems to the effectiveness



of the operative reaction of means of safety of industrial object; 0,33 – the influence fate of the safety management system of industrial object to the effectiveness of the operative reacting tools.

To evaluate the effectiveness increase of operative reacting tools by improving the efficiency functioning of the management system (ΔE^{SIO}) it is possible by the formula:

$$\Delta E^{SIO} = \frac{E \frac{SIO}{r} l - E \frac{SIO}{r}}{E \frac{SIO}{r}} \cdot 100\% \quad (3)$$

where $E \frac{SIO}{r} l$ – effectiveness of using the operative reacting tools safety of industrial object on the recommendations to improve the effectiveness of functioning of the management system; $E \frac{SIO}{r}$ – the existing effectiveness of using operative reacting tools.

To determine the functioning effectiveness of using increase of operative reacting tools by increasing the efficiency of the safety management system of industrial object it is necessary to make its evaluation. This evaluation is made in the position of compliance requirements was imposed on it at liquidation of consequences of an emergency [3-5].

Indicator of efficiency of the safety management system of the industrial object at liquidation of consequences of any emergency can be represented as a function of interoperability, efficiency and sustainability:

$$M^{SIO} = f(\text{inter}, Ct, On) \quad (4)$$

Indicator K^{SMSIO} was characterizing the compliance of safety management system of industrial object to requirements it imposed at liquidation of consequences emergencies. This value can be varied within:

$$0 < K^{SMSIO} \leq 1.$$

For indicator for assessing the efficiency of functioning of safety management system of the industrial object at liquidation of consequences of any emergency was



selected the condition at which the level of efficiency of the control system should not be less than necessary:

$$K^{SMSIO} \geq K^{SMSIO^N}, \quad (5)$$

where K^{SMSIO^N} – the necessary values of adaptability of safety management systems of industrial object to operating conditions in emergency mode.

The necessary value of adaptability coefficient of system of management of civil protection at liquidation of consequences of an emergency is not constant and will have specific meaning in each case.

The efficiency of functioning safety management system of industrial object was proposed carry out by conformity assessment system through requirements that most affect the efficiency of its functioning in emergency mode.

Considering those circumstances, as the partial indicators for assessing the efficiency of control system was selected:

1. The indicator interoperability was selected the compatible coefficient of functioning safety management systems of industrial object structures of industry object that are part of the operational group of the appropriate forces (K_{inter}), which characterizes the ability of management system to function in a single information space with systems management of structures are in operative reacting at liquidation of consequences of an emergency.

This indicator was calculated by the following mathematical expression [5]:

$$K_{inter} = \frac{1}{n} \sum_{i=1}^n K_{interin} \cdot W_{in}, \quad (6)$$

where $i=0, 1, 2, \dots, n$; $K_{interin}$ – single dimension n-th figure was lying on the i-th level; n – number of indicators on the i-th level; W_{in} – the weight of each indicator on i-th level, which characterizes its share in the total amount of indicators, with $\sum W_i = 1$.

2. An indicator of the functioning efficiency of the safety management system of industrial object was chosen the probability of management challenges by safety



management authorities of industrial object during the time, what not exceeding critical (r_{itm}^{maSIO}), which characterizes the ability of safety management authorities of industrial object to serve the conditions when the rate of information aging will not lead to lower quality of implementation of the task management in emergency mode.

3. An indicator of sustainability of management system functioning was selected the rate of meet the challenges stability of the safety management of industrial object (K^{ct}), which characterized by the probability of sustainable functioning of i-th item of the safety management of industrial object (R_i), as a key element of management system operational response where employing appropriate controls and focus management tools, which in turn is determined by the survivability of command and control operational response (R_l), interference immunity (R_i) and technical and operational reliability (R_{tr}).

The coefficient compatible of functioning management system structures that are part of operative reacting (K_{inter}) which characterizes interoperability of safety management system of industrial object at the emergency consequences elimination; the probability of management challenges by operative reacting (r_{itm}^{maSIO}) for a time not exceeding critical, characterizing functioning efficiency of the safety management system of industry object; the likelihood of sustainable functioning of i-th control point (R_i) characterizing resistance of solving problems of safety management of industrial object (K^{ct}). All these coefficients by its nature are probabilistic nature.

Because effective functioning of safety management system of industrial object at the emergency consequences elimination is essentially simultaneously serving of relatively independent events – interoperability and sustainable functioning, its indicator can be represented by the multiplied of indicators that characterize these events:

$$K^{maSIO} = K_{inter} \cdot K^{ct}, \text{ with } r_{itm}^{ma<SIO} \geq r_{itm}^{maSIO}^N \quad (7)$$



Physical meaning (K_{inter}) is that it reflects the degree of capacity of safety management system of industrial object of function in a single information space with management of structures systems that are part of operative reacting during emergency consequences elimination and its significance is in the range $0 \leq K_{inter} \leq 1$.

Physical meaning (K_{ct}) is that it reflects the degree of solving problems of safety management of industrial object at i-th point, and control that is part of the operative reacting at liquidation of the emergency consequences, and its significance is in the range $1 \leq K_{ct} \leq 1$.

Physical meaning (r_{itm}^{maSIO}) is that it reflects the ability of safety management of industrial object to serve the conditions when the rate of aging information will not lead to lower quality of task management with operative reacting at emergency consequences elimination, and its significance is in the range $0 \leq r_{itm}^{maSIO} \leq 1$.

Conclusions. The proposed indicators allow with a precision that is allowed to assess not only the degree of compliance with the eligibility criteria of the safety management system of the industrial object at liquidation of consequences emergency situations of different nature, but also to develop informed recommendations for improving the effectiveness of its functioning in emergency mode situation.

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j12-027

DOI: 10.21893/2227-6920.2017-12.027

UDC 621.36.5

METHOD OF DETERMINING EFFICIENCY OF THERMOELECTRIC MATERIALS

МЕТОД ОПРЕДЕЛЕНИЯ ЭФФЕКТИВНОСТИ ТЕРМОЭЛЕКТРИЧЕСКИХ МАТЕРИАЛОВ

s.t.s., as.prof. Danalakyi O.G./ к.т.н., доц, Даналакий О. Г.

Khabiuk A. Y./ Хабюк А. Я.

*National University tenni "Kharkivskyu poltechnic Institute", Frunze, 21, 61002, Національний
технічний університет «Харківський політехнічний інститут», Харків вул. Фрунзе, 2*

Abstract. Method is based on determining the electrical power loss in the event of eddy currents in the sample placed in the gap of the core inductors, which nourishes the asymmetrical current.

Keywords: eddy current Foucault, Ampere, thermoelectric material, the thermoelectric power, thermal conductivity, electrical conductivity, thermoelectric efficiency.

Introduction.

One of the main parameters of thermoelectric materials, along with the coefficients of the thermopower, electrical conductivity and thermal conductivity, is the efficiency [1]. At present, there are a sufficient number of methods of its determination [2], including by measuring the electrical conductivity of the thermoelectric sample under isothermal and adiabatic conditions [3]. However, it should be noted that the presence of electrical contacts leads to an increase in the error and some inconveniences. Research capabilities of eddy current non-contact method of monitoring the electrical conductivity of thermoelectric materials [4,5] showed it to the prospect. The aim of this work is the study of the physical features of this method.

It is based on the physical effects of the interaction of electromagnetic fields

with the studied substance. It is known, the electric quality factor Q_1 of the oscillating circuit inductance L and resistance R is represented as follows:

$$Q_1 = \frac{\omega L}{R} = \frac{\omega LI^2}{RI^2} = \frac{P_p}{P_a}, \tag{1}$$

where ω – circular frequency of oscillations of the circuit, I – is the electric current in it, P_p – reactive power, P_a – active power rubbed in the circuit (Fig.1).

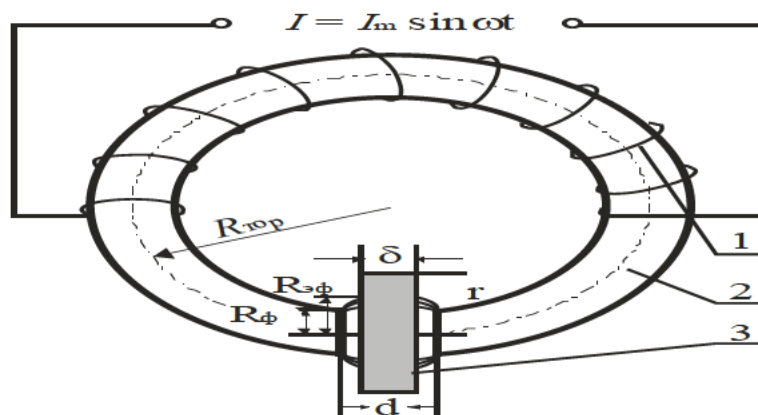


Figure.1. The oscillatory circuit with the sample:

- 1 – winding inductors, 2 – toroidal ferrite ring,
- 3 – controlled sample.

When making this loop of a sample of thermoelectric material (see figure) power by active electrical P_{a0} is added to the active power losses in the circuit. In this case, the electrical q of the circuit with the sample is defined as,

$$Q_2 = \frac{P_p}{P_a + P_{a0}} \tag{2}$$

The expression for the electrical losses introduced by the sample, is as follows:

$$P_{a0} = \frac{Q_1 - Q_2}{Q_1 Q_2} P_p \tag{3}$$

In general, these losses correspond to the electric power generated in the thermoelectric volume of the sample in the circulation of the induced eddy currents, and are mainly known for the effects of Joule and Peltier. When passing through the measuring oscillating circuit of electric current view

$$I_1(t) = 0,5I_{max}[1 + sign(\sin(2\pi Ft))] \cdot \sin(2\pi ft),$$



where I_{\max} - is the maximum value of sinusoidal current, F , and f - is the frequency of high-frequency pulse sequence and modulation current, respectively, in the sample of radius r -industires vortex electric current Foucault density f submitted the following expression:

$$j_{\Phi} = \sigma_c E = \frac{\sigma_c}{2\pi r} \frac{d}{dt} \int_S B dS = \frac{\sigma_c}{2\pi r} \frac{d}{dt} \int_S \mu H_m [1 + \text{sign}(\sin 2\pi Ft)] \cdot \sin(2\pi ft) dS, \quad (4)$$

where σ_c – averaged AC-conductivity of the sample material, E - is the electric field intensity, B – magnetic field induction in the gap of the ferrite core, S is the cross – sectional area of the core, S – magnetic permeability material of the core, H_m – the magnetic field. The heat flux density caused by the Joule effect, at some point with coordinates (x_0, y_0, z_0)

$$q_{cp\mu\omega c}(x_0, y_0, z_0) = \frac{\omega L I^2}{\pi R_{\Phi}^2} \frac{Q_1 - Q_2}{Q_1 Q_2} = j_{cp\Phi}^2(x_0, y_0, z_0) \sigma_c^{-1}, \quad (5)$$

R_{Φ} –where is the effective radius, $j_{cp\Phi}$ –current density of the eddy at the point with coordinates (x_0, y_0, z_0) belonging to one of the end faces of the specimen, located at the beginning of the chosen laboratory coordinate system XYZ. The heat loss caused by the Peltier effect, and hence axial temperature gradient in this case is not provided .

$$\sigma_c = c \frac{Q_1 - Q_2}{Q_1 Q_2 d \left(1 + 4 \ln \frac{R_{mop}}{R_{\Phi}} \right)}, \quad (6)$$

$$c = \frac{\pi \omega \mu_0 (\mu_n')^2 R_{\Phi} l_{cp}}{8 \mu_{\Phi}' S}, \quad (7)$$

where Q_1, Q_2 – electrical q of the circuit without sample and with sample, respectively; d and R_{mop} – gap width and the average radius of the ring sensor, respectively; ω – circular frequency of the measuring oscillating circuit; μ_{Φ}' and μ_n' dynamic magnetic permeability of the sample material and the ferrite core circuit, respectively; S - is the area of its cross section; l_{cp} – the average length of the magnetic lines of force.

Asymmetric electric current having the form



$$I_1(t) = 0,5I_{\max} [1 - \text{sign}(\sin(2\pi Ft))][(1 - z/z_0) + \sin(2\pi ft)],$$

causes the appearance in the gap of the core magnetic field induction, consisting of the sum of a variable (sinusoidal) and constant components of the magnetic field. The variable component of $B_1(t)$ induces in the sample, the eddy currents, each of the half-cycles which is characterized by its own magnetic flux, $(\pm\Delta B')$ which interacts further with the constant component B_0 of the magnetic field.

When positive half-cycle current of the eddy due to the ampere force, these components are summed ($B_1=B_0+\Delta B'$), negative – subtracted ($B_2=B_0-\Delta B'$). This leads to a spatial-temporal redistribution of the charge carriers in the volume of the thermoelectric sample. Magnetic induction in different directions leads to leakage of the eddy currents of different polarities on opposite end faces of the specimen. Such zonal stratification occurring half-cycles of the eddy currents leads to a corresponding volumetric redistribution of selected bi-directional fluxes of heat Peltier q_{cpII} . The value of heat flux density at a point (x_0, y_0, z_0) in this case is equal to

$$q_{cp}(x_0, y_0, z_0) = q_{cpI\Delta c}(x_0, y_0, z_0) + q_{cpII}(x_0, y_0, z_0). \tag{8}$$

The density of the heat flow is represented by the expression

$$q_{cpII}(x_0, y_0, z_0) = \frac{\omega LI_2^2}{\pi R_{\phi}^2} \frac{Q_2 - Q_3}{Q_2 Q_3}, \tag{9}$$

and the average value of the electrical conductivity of the material □and the
piece is equal to

$$\sigma_a = c \frac{Q_1 - Q_3}{Q_1 Q_3 d \left(1 + 4 \ln \frac{R_{mop}}{R_{\phi}} \right)}, \tag{10}$$

where Q_3 - is the electrical q of the circuit with the sample in the case of asymmetric periodic current. Symmetrical current I_2 oscillating circuit causes the heat loss caused by the Joule effect and Peltier effect, and their ratio is determined by the density of eddy currents Foucault f and thermoelectric parameters of the material sample. I_f the value of the current density Fouca $j_{cp\phi}$, flowing in the sample point with coordinates (x_0, y_0, z_0) belonging to the interval $((0 < r < R_{\phi}))$, restricted to $0 < j_{cp\phi} < 0$, this leads to the following inequality is satisfied



$$q_{cpI\kappa}(x_0, y_0, z_0) \ll q_{cpII}(x_0, y_0, z_0)$$

The average value of thermopower is determined as follows

$$\alpha_{cp} = \sqrt{\frac{\chi_{cp}}{\sigma_a T}}, \quad (11)$$

where χ_{cp} – averaged value of thermal conductivity coefficient of the sample material.

On the other hand, from [1] should

$$\alpha_{cp} = \sqrt{\frac{\chi_{cp} Z_{cp}}{\sigma_c}}, \quad (12)$$

where Z_{cp} – coefficient of thermoelectric efficiency of the material sample.

Equating (11) and (12), given (6), (7) and (10) we obtain the expression for thermoelectric efficiency:

$$Z_{cp} = \frac{\sigma_c}{\sigma_a} \frac{1}{T} = \frac{Q_1 - Q_2}{Q_1 - Q_3} \frac{Q_3}{Q_2} \frac{1}{T}. \quad (13)$$

Summary and Conclusions.

Thus, under the adopted assumptions, the eddy current technique allows contactless to determine the efficiency of thermoelectric materials. Research based samples of crystals of solid solutions Bi-Te-Se-Sb, carried out on a properly modified system [5,6], using eddy current sensors confirmed these findings. Numerical estimates of the error shows that it does not превышает 31%.

Specific methods of determination of the thermoelectric quality factor Z for the cases termoelektricheskie isotropic and anisotropic, and periodically heterogeneous structures and functionally gradient materials will be presented in subsequent publications.

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Аннотация.

Метод основан на определении потерь электроэнергии в случае возникновения вихревых токов в образце, размещенный в зазоре сердечника катушки индуктивности, которая питает асимметричным током.

Ключевые слова: вихревые токи Фуко, Ампер, термоэлектрического материала, термоэдс, теплопроводности, электропроводности и термоэлектрической эффективности.

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**j12-043****DOI: 10.21893/2227-6920.2017-12.043****TESTING OF ELECTRONIC COMPONENTS****ИСПЫТАНИЯ ЭЛЕКТРОННЫХ КОМПОНЕНТОВ****d. t. n., prof. Piganov M.N. / д. т. н., проф. Пиганов М. Н.****k. t. h., Nasedkin A. V. / к. т. н., Наседкин А. В.****Shumskih I. Y. / Шумских И. Ю.****k. t. n., as. prof. Tyulevin S. V. / к. т. н., доц. Тюлевин С. В.***Samara University, Samara, Moscow highway 34**Самарский Университет, Самара, Московское шоссе 34*

Abstract: The method of accelerated testing of solder joints of research, described the criteria for refusal of such compounds. Test exposures are selected. The design of the test module. Model is chosen reliability of the solder joint.

Keywords: Accelerated testing, surface mount, solder joints, tests module, model, test impact.

I. Introduction.

One of the main problems of reliability of a radio-electronic product of the Russian vendors of space and war industry, the arisen ambassador of appearance of the directive on waste radio-electronic and electric equipment (WEEE-Waste Electrical and Electronic Equipment) and the directive on abbreviation of dangerous substances in radio-electronic and electric equipment (RoHS-Restriction of Hazardous Substances), approved by the European Community at the beginning of this century, is reliability of solder bond of outputs of an electro radio product (ERP) with a lead-free covering with use of lead-bearing solder. Nowadays, the domestic radio-electronic industry provides developers of radio-electronic equipment only partially with necessary products of electronic technique, so, they should resort to use of import components which in most cases are issued in common industrial execution ("industry") and doesn't use as a part of a finishing covering lead. Now in literature very few attentions is given to questions of quality and reliability of mixed solder bonds when lead-free and lead materials are combined. Thus the task of soldering of



a component with the covering of outputs containing lead, lead-free solders, and not vice versa, as a rule, is considered [1,2].

II. ACCELERATED TESTS ON RELIABILITY.

2.1. General provisions

The purpose of accelerated tests is achievement of failed state or accumulation of damages owing to operation of a certain mechanism of corrupting, but in time smaller, than it would be required in case of operation of a product. For achievement of it there are some general methods:

- Intensity of parameters on which the longevity depends, can be increased for abbreviation of longevity.

- Value of the parameters influencing longevity can be maintained at the estimated level, but influence is executed with the increased frequency that leads to abbreviation of duration of tests.

- There is also a possibility of application of these two approaches is combined.

Establishment of a ratio between accelerated test and real operating conditions which are put on acceleration has a special importance, without it any outputs can be quite misleading.

Using accelerated tests can also be dangerous as they enter uncertainty factors though, it is impossible to avoid them generally because the required period of the active existence is too great for carrying out tests in more realistic conditions.

There are different types of tests for separation of different processes of corrupting. For an acceleration of mechanisms of corrupting on which the longevity of solder bond depends, it is necessary to execute tests for thermal fatigue, a heatstroke and vibration tests. The type selection and test conditions shall be carried out based on the appropriate mechanisms of a failure or damage and operating conditions.

2.2. Thermocycling

During thermocycling, test boards are exposed to serial influence of high and low temperatures with certain times of an exposure. In order to avoid a heatstroke the speed of change of temperature shan't exceed 20 °C/min. For creation of damages



from fatigue/creep processes, taking into account a space scope, the range of temperatures from $-30\text{ }^{\circ}\text{C}$ to $+80\text{ }^{\circ}\text{C}$ with exposures is necessary about 15 minutes in case of certain values of temperatures.

2.3. Vibration

2.3.1. Conditions of impact of accidental vibration

By results of researches, spectral content of vibrations, by which the electronic equipment is affected, is distributed in a broad range of frequencies. It means that vibrations of any frequency are present at the same time at different combinations of intensity. The experiments, made in controlled conditions, showed that broadband influence in case of tests can be modeled successfully, applying non-cycle (accidental) vibration.

Ranges of non-cycle vibration are defined as profiles of the spectral density of acceleration (also called spectral density of energy) which connect levels of density of energy to certain frequency bands. Vibration is defined rather appropriate frequency range.

Using of root mean square values of acceleration is incorrect for the description of vibration tests, as the root mean square value of acceleration doesn't characterize a specific profile of vibration. With one root mean square value of acceleration it is possible to describe the infinite number of variations of the frequency bands and spectral forms. Therefore in case of measurement of value and spectral content of vibrations or tests energy content will correspond to a certain frequency band.

2.3.2. Conditions of impact of sinusoidal vibration

Test is carried out by the smooth frequency change in the given range from the lowest to the higher and back. Tests of products with the linear resonance characteristics carry out by frequency change in one direction.

Value of speed of frequency change is set to equal one-two octaves in a minute. If monitoring of parameters of products requires the bigger time than provided at this speed of frequency change, it is allowed to set frequency change speed less than one octave in a minute.

Thus the speed of frequency change shall be maximum, but sufficient for



support of monitoring of necessary parameters.

Value of speed of frequency change is allowed to set equal 10 Hz/min in the range of the frequencies of 1-50 Hz. In the range of frequencies lower than a frequency of transition we support the constant amplitude of relocation, and in the higher range of frequencies - the constant amplitude of acceleration.

2.3.3. Influence of a mechanical impedance

It is necessary to make the correction considering influence of mechanical impedance as advantages from approximation of test conditions to real compensate expenses of time, efforts and money.

Response of construction of the equipment hides own dynamic influence on function of external influence. On resonance frequencies of construction, when answer influences increase, it loads adjacent reference elements (that creates dips of the characteristic of spectral density of acceleration at these frequencies). Value of influence of loading is defined by the relative impedance of construction of the equipment and reference elements. As it is known from practice, the resonating element creates the loading force, proportional to its dynamic weight increased by the appropriate gain amount.

Influence of a mechanical impedance can give the contribution to formation of a range of vibration tests. Depth of dips is determined by results of measurements or an estimated way.

2.4. Acceleration of impact of vibrations

It is necessary to execute vibration tests only in the presence of reliable fixing or on closed systems to consider exact characteristics of resonance frequencies and operating conditions.

There are three different types of vibration tests; each of them has the independent purpose:

- The functional vibration tests are intended for checking of operability of the equipment in case of the maximum expected vibration level. Duration of the functional tests is selected sufficient only to make sure of operability of the equipment.



- Tests for firmness are intended with the purpose to show that the equipment has constructive and functional longevity, comparable with technical purposes. Levels and duration of tests for firmness are set by rising of the function levels and increasing duration of test before origin of fatigue damages, which is the equivalent acquired during service life. It leads to that levels of vibration tests exceed most expected in case of operation, in certain cases they are much higher. In tests for firmness the fatigue longevity as they don't proceed before corrupting of the equipment isn't surely set. Tests for firmness are carried out only during the given time frame. Statistical value of selection is rather small adequately to judge fatigue longevity.

- In case of accelerated tests on longevity, the raised function levels are applied, as well as in tests for firmness, but tests last to the full crush of the equipment. Thus few test boards shall be used to provide statistical reliability of the accelerated fatigue longevity.

For scaling levels of vibration, duration of tests and an output of conversions of acceleration often use the simplified ratio for fatigue when loading accidental vibration. In the equation two modes of tests, 1 and 2 are compared:

$$\left(\frac{\text{СПЭ}_1}{\text{СПЭ}_2}\right)^M = \frac{t_2}{t_1} \quad (1)$$

СПЭ – SDE - spectral density of energy (G²/Hz);

t – Time (s);

M – A material constant.

It represents the linear bi-logarithmic dependence of SDE from time, which negative inclination is equal 1/M, if to postpone time on a horizontal axis. The equation (1) can be presented in the form of a ratio of Baskvin for multi-cycle fatigue or in the form of the conventional curve S/N, the linear double logarithmic dependence between tension and quantity of cycles before a failure. Value of M for solder bonds is ranging from 3 to 4.

Small deviation of a measure value of M, can cause essential change of the predicted longevity of a printing node if the equations are used for count upon



transition from one mode to another. The probability of origin of an error of extrapolation especially increases if the longevity on two modes differs more than ten times therefore when carrying out test it is necessary to select duration taking into account feasibility of operation at the low levels of vibration.

2.5. Tests for mechanical shock

Tests for mechanical shock represent an intensive acceleration which imitates severe conditions of operation. Instantaneous applied loads or sharp changes of nature of movement belong to these conditions (for example, start of the carrier rocket). Shocks of this category can break utilization properties or cause damage similar to what arises in case of excessive vibration.

Very fast and sharp cycles of loading are applied to tests for mechanical shock. Usually shock pulses have an order from 500g to 30000g with pulse duration from 0.1 to 1.0 milliseconds. High frequency of following of cycles allows carrying out tests using very small loadings or the ranges of offset.

Mechanical shock is characterized by the maximum amplitude, duration and acceleration, and usually applied to system in the form of a push, pulse or a step. Response of system to shock depends by nature of shock, configuration and materials of system, orientation of system concerning the direction of shock and resonance frequency (or frequencies) systems. With the small duration of a push or clock period the system can vibrate on natural resonance frequency; amplitude of these free oscillations decreases depending on the damping properties of system for dissipation of mechanical energy like the thermal over time.

Tests for mechanical shock are urged to give the quantitative reliability assessment of a product or component in controlled laboratory conditions. That is more preferable than operational testing of operation for the following reasons:

- The time diagram of shock gives in to monitoring and can be reproduced for the purpose of comparing; besides, it can be changed in the range selected from widespread operating conditions.

- Recording of shock and response to it in real time for the further analysis and operation is possible in the conditions of laboratory.



- It is more expedient to use time and means spent for execution of a set of laboratory tests for carrying out several field tests.

The weight and distribution of lot of printing assembly of PM can have impact on the time diagram of installation. Especially for percussion tests, if the mass of a sample is significant in comparison with a lot of installation.

The type of the time diagram of shock is selected by proceeding from the expected impact on a sample of test [2].

III. DEVELOPMENT OF THE TEST MODULE.

3.1. Simulators of ERP

All components shall be prepared for internal interconnecting of outputs so that in case of connection with a figure of a substrate of a printing node the complete topology of a measuring circuit was formed.

As simulators of ERP it is expedient to select components of TopLine Dummy Components firm, being the leader in quality of products.

For mounting on a printing node it is necessary to select only those types of components which are used in case of surface mounting in specific equipment.

3.1.1. PLCC components

PLCC (Fig. 5) represents the low-profile square ceramic package with the J-shaped contacts located on its lower part intended for surface mounting.

3.1.2. QFP components

QFP (Fig. 6) — the flat package with four rows of contacts. Represents the square casing with the contacts located at the edges. Depending on material of the casing select two options of execution:

- PQFP (Plastic QFP) — has the plastic casing;
- CQFP (Ceramic QFP) — has the ceramic casing;

There are also other options: TQFP (Thin QFP) — with the small height of the casing, LQFP (Low-profile QFP).

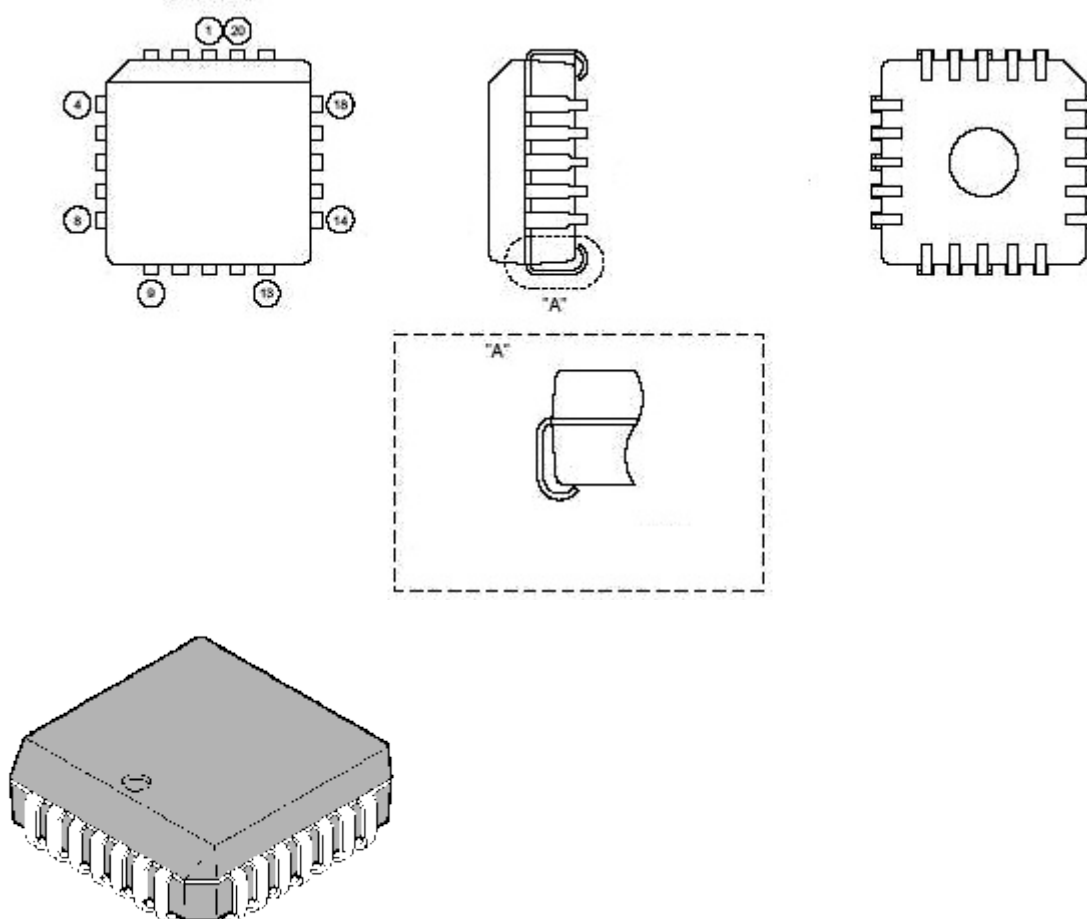


Figure. 5. PLCC which is used on a test printing node

3.1.3. SOIC components

SOIC (Fig. 7) - the type of the casing of a chip intended for surface mounting. Has the form of a rectangle with two rows of outputs on the long sides. Chips in the SOIC casing occupy 30-50% less PCB areas, than their analogs in the DIP casing, and also usually have thickness, smaller for 70%. As a rule, numbering of outputs of identical chips in the DIP and SOIC casing matches. In addition to abbreviation of SOIC for designation of the casing of this type the letters SO and number of outputs can be used. For example, the casing of a chip of a widespread series of TTL-logic 7400 having 14 outputs can be designated as SOIC-14 or SO-14.

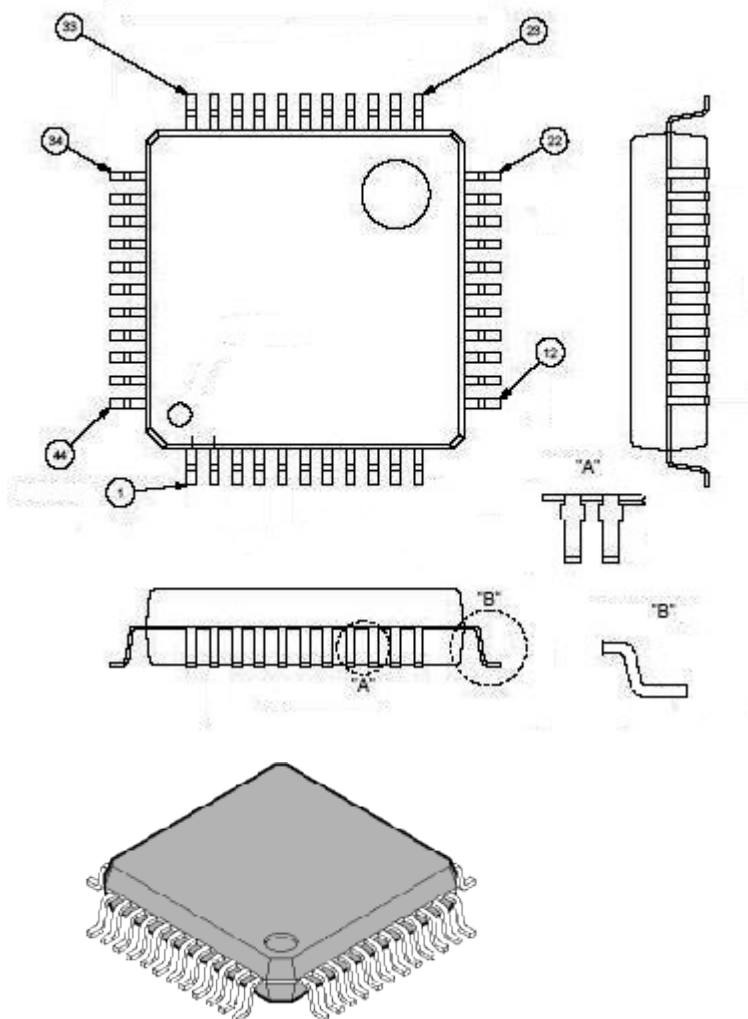


Figure. 6. QFP which is used on a test printing node

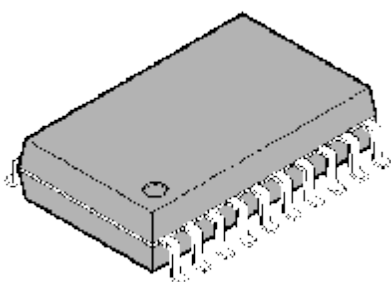


Figure. 7. The SOIC casing which is used on a test printing node

3.1.4. LCC components

LCC (Fig. 8) represents the low-profile square ceramic package with the contacts located on its lower part intended for surface mounting.

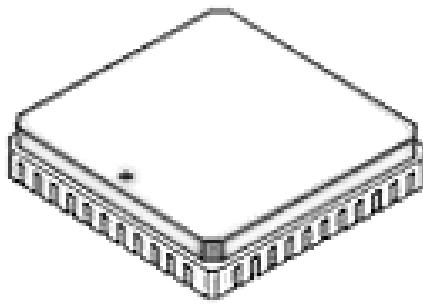


Figure. 8. The LCC casing which is used on a test printing node

3.1.5. Passive component of chip

The component intended for surface mounting has the form of a parallelepiped (Fig. 9). Types of the casing designate the sizes of the upper edges in inches and have standard values 01005, 0201, 0402, 0603, 0806, 1206, etc. On a test printing node simulators from 0402 to 1206 are mounted.

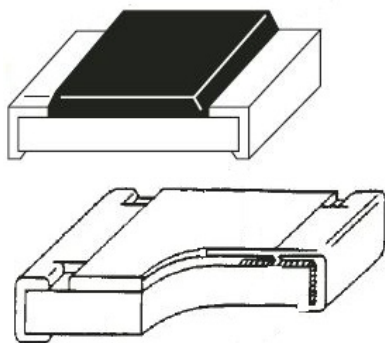


Figure. 9. The chip casing which is used on a test printing node

3.1.6. DIP components

DIP (Fig. 10) — type of the casing of chips, microassembly and some other electronic components. Has a rectangular form with two rows of outputs on the long sides. It can be executed from plastic (PDIP) or ceramics (CDIP). Usually in designation the number of outputs is also specified. For example, the casing of a chip of a widespread series of TTL-logic 7400 having 14 outputs can be designated as DIP14.

Different semiconductor or passive components - chips, assemblies of diodes, transistors, resistors, small-size switches can be issued in the DIP casing.



Components can be sealed directly in the printed circuit board, inexpensive connectors for lowering of risk of damage of a component when soldering can be also used.

Components in the DIP casing usually have from 8 to 40 outputs; also there are components with smaller or large even number of outputs.

Outputs are numbered counterclockwise since the left upper. The first output decides on the help of "key" - dredging on the brink of casing.

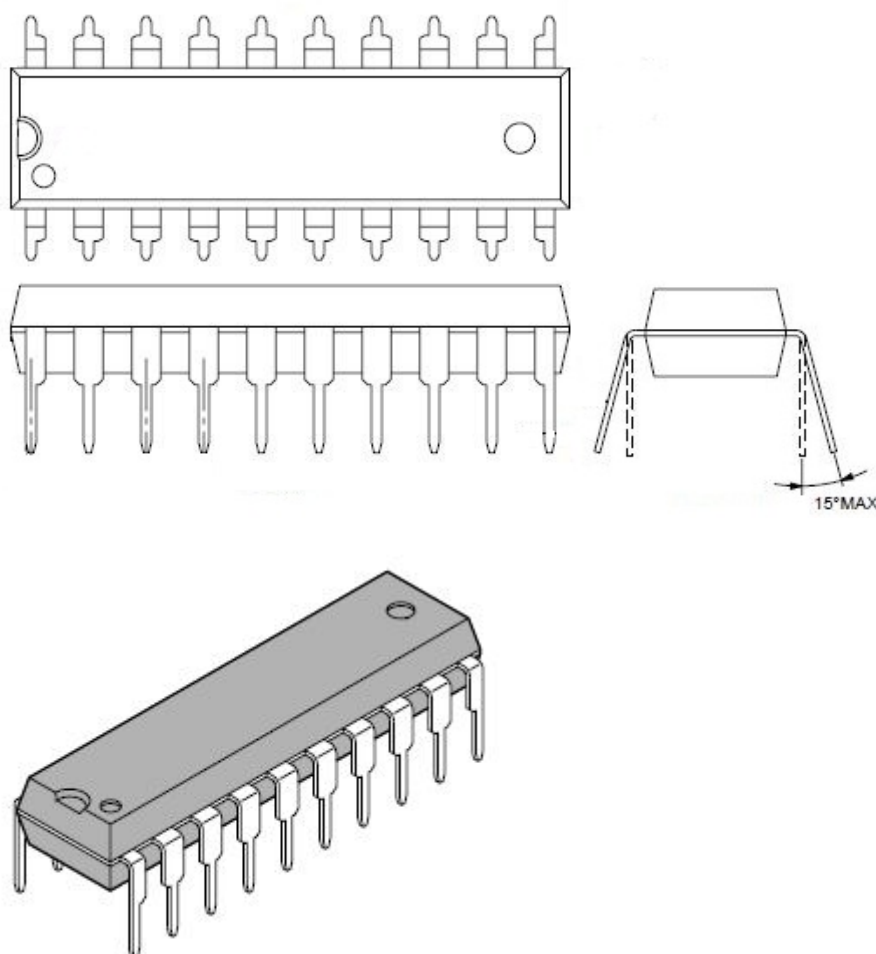


Figure. 10. The DIP casing which is used on a test printing node

3.1.7. SOT223 components

SOT (Fig. 11) – is the chip in the plastic casing with five outputs and with the plane heat sink in the lower part.

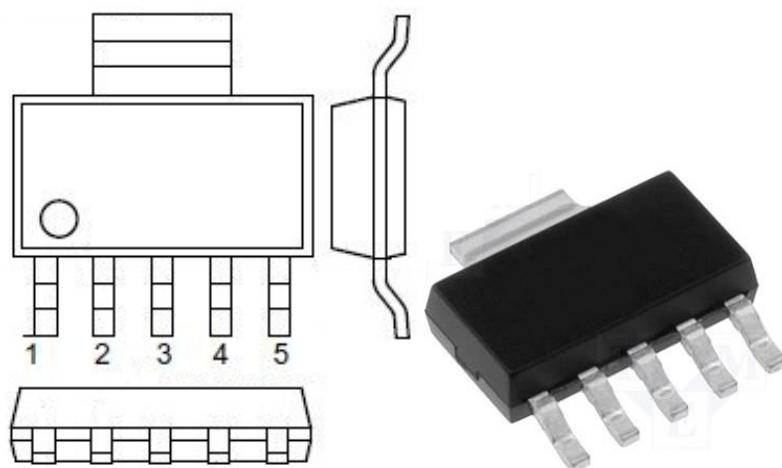


Figure. 11. SOT223 the casing which is used on a test printing node

3.1.8. DDPAK components

DDPAK (Fig. 12) - the casing with type inferences "larkspur" and one plane heat sink which can be connected to the earth bus.

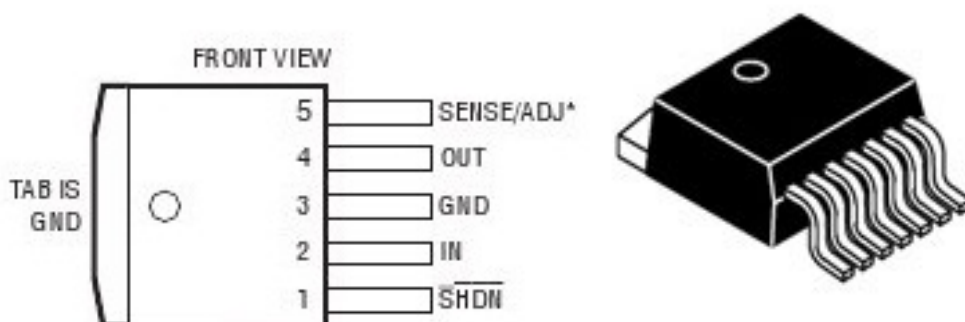


Figure. 12. DDPAK the casing which is used on a test printing node

IV. FAILURE CRITERIOUS IN CASE OF TEST OF SOLDER BONDS.

One of the most complex challenges which stand when carrying out accelerated tests is a determination of fatigue of solder bond and its subsequent detection. Comparing of test results can be hard or practically impossible because of incomparability of failure criterions. Periodic visual control of appearance of cracks, searching of violation of structure of solder bond in lowering of the initial durability through certain intervals of time, observation of hysteresis curves tension deformation for separate solder bonds, and also determination of a failure in terms of



characteristics of hysteresis curves, monitoring of electrical resistance on value of increase rather initial, monitoring of electrical resistance for the purpose of detection of short-time electrical breakaways belong to these criteria in solder bond.

The failure criterions requiring periodic interruption of tests can prolong considerably time necessary for carrying out tests violate experimental conditions and affect results. Accidental selected determination of a failure can serve as corrupting indicators only if they are executed in coordination. However, existence of a set of different determination of a failure and the used methods of measurements complicate comparing.

For carrying out accelerated tests on reliability it is necessary to use the following criteria. The failure is defined as the first interruption of electrical integrity of a circuit which is confirmed with nine additional interruptions within additional 10% of cyclic longevity.

Detection of a failure shall be carried out by the continuous monitoring of sequential topology of test circuits as follows:

- At least one interruption of a circuit of no more than 1 microsecond can be registered for each measuring circuit during any interval of inquiry lasting not more than 2 seconds;
- At least 10 such interruptions on each measuring circuit can be registered for confirmation of indication of the first failure.
- Control current doesn't exceed 2mA at a voltage no more than 10 V and the rupture of an electrical circuit is determined by resistance of a circuit, equal 1000 Ω and more.

V. PLANNING OF ACCELERATED TESTS ON LONGEVITY.

In the characteristic of reliability, it is important to set correlation parameters between the accelerated influence of tension and external conditions in case of finite application.

When planning experiment it is necessary to provide check of at least two independent variables to compare them to the dependent. In case of tests of solder



bond for reliability of the single dependent variable is the quantity of cycles by which the instrument is affected. Cyclic influence imitates operation of the instrument and communicates with conditions of a situation of finite application. Then the following independent variables should be considered:

- Vibration swing of temperature;
- Component sizes;
- Coefficients of thermal extension;
- Height of fillet of solder bond;
- Rigidity of outputs;
- Probability of a failure.

VI. CONDITIONS OF CARRYING OUT.

Test modules shall be manufactured according to operating technological documentation and have sequence numbers.

Test modules shall have the accompanying documentation in which all technological operations of their manufacture and the typeful delivery list of a covering of electro radio products are reflected.

Before installation in the frame, twelve test printing nodes shall be repaired according to standard technological process of preparation for accelerated tests for simulation of repair when mounting real analogs.

Quality control of solder bonds, which entering test modules, shall be carried out after manufacture of a printing node on compliance to requirements of standards: OCT92 - 1042; IPC – 610D.

Quality of solder bonds of electro radio products with a matrix pin configuration is checked on external rows by means of an erzaskop and all solder bonds by means of roentgenoscopy. The admissible amount of emptiness in PS shall correspond recommendations of IPC – 610D.

The samples of standard representatives of test modules shown on tests beforehand shall pass technological tests (running) for the purpose of detection and elimination of the latent defects and failures during an operating time and to be accepted by Quality Department on compliance to requirements of designer



documentation.

Test electronic modules for carrying out preliminary tests of physical and chemical properties of solder bonds need to be subjected to the accelerated temperature aging, before carrying out tests, by an exposure them within 300 hours at a temperature of 1000 C on air for simulation of some period of an acceleration of such possible processes, as growth of grains of solder and dendrites, formation of intermetallic compounds, and oxidation. Air temperature in locations where are made accelerated tests of solder bonds shall be ranging from 15 to 35 °C in case of relative air humidity from 45 to 75% and atmospheric pressure from 645 to 795 mm Hg. Before accelerated tests on the test electronic unit thermocouples, for temperature monitoring on a surface of the printed circuit board shall be set. As additional monitoring of heating of the test module the noncontact infrared thermometer directed on one of modules shall be set. At least 2 thermocouples on a surface of the test module according to application of B who have the smallest convective heat exchange shall be set [4].

For further stabilizing of structure of solder after accelerated aging samples shall be withstood in case of indoor temperature within two weeks before investigation tests.

Operating conditions according to requirements imposed to products of group 5.3 in accordance. (The equipment intended for installation in unpackaged instrumental bays or containers of spacecrafts using measures of thermal protection belongs to group 5.3) taking into account requirements of the specification on onboard radio-electronic equipment.

VII. CONCLUSION.

The offered technique of research accelerated tests of electronic clusters on the basis of import element base. The test module providing reduction of time of tests is developed. Criteria of refusal at tests are injected. The plan (module) of accelerated tests providing the required accuracy and reliability is developed.

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Аннотация.

Показано, что возникла проблема использования электронных компонентов бессвинцовых покрытием. Для подтверждения надежности компонентов бессвинцовыми выводами предложено использовать ускоренные испытания на надежность. Они включают в себя: термоциклирование, воздействие вибрации, механические удары. Предложено конструкция тестового модуля с имитаторами компонентов фирмы TopLine Ditty Components. Рассмотрены конструктивные особенности PLCC, QFP, SOIC, LCC, DIP, SOT223, DPAK компонентов. Разработаны условия приведения ускоренных испытаний. Приведена методика приведения ускоренных испытаний.

Ключевые слова: испытания, электронные компоненты, бессвинцовые выводы, надежность, ускоренные испытания, конструкции компонентов.

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Supervisor: prof. Piganov M.N.

Reviewer: Prof. , Antipov O.I.

Article sent: 30/03/2017 of

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j12-001

DOI: 10.21893/2227-6920.2017-12.001

THE PROBE SENSORS IN THE SYSTEM OF ACOUSTIC STRUCTURAL MONITORING WATER

ЗОНДИРУЮЩИЕ ДАТЧИКИ В СИСТЕМЕ АКУСТИЧЕСКОГО СТРУКТУРНОГО МОНИТОРИНГА ВОДОПРОВОДА

с.т.с., as.prof. Zibrov V.A. / к.т.н., доц. Зибров В.А.

ORCID: 0000-0002-2311-7581

graduate student Maltseva D.A. / аспирант Мальцева Д.А.

Don state engineering university, Rostov-on-Don, Gagarin's square 1

Донской государственный технический университет, Ростов-на-Дону, пл. Гагарина 1

Abstract. The considered control scheme of the piezoelectric sensor probe (PS), the method of computation of program controls of linear and nonlinear elastic mechanical systems with a finite number of degrees of freedom described by using the finite element method. It is shown that if the acoustic structural monitoring of the water supply system more reliable against interference are control systems with feedback.

Key words: the probing sensor, acoustic, piezoelectric ceramic, monitoring, structure, distribution, pipeline distribution network.

Introduction.

Currently, the activities of housing and communal services is accompanied by very large losses of resources consumed by utilities and provided to consumers of water, heat and electric energy. At the same time, businesses have no tangible incentives or financial capacity to replace specific amounts of obsolete equipment and worn-out fixed assets. Therefore, the main task of the participants of the process water can be formulated as the integrated use of all levers of the demand for resources and encourage resource conservation: technical, economic, regulatory, institutional and informational.

The solution to this problem is related to the implementation of complex engineering activities such as: optimization of operating modes of water supply



networks through the introduction of automated control systems; application equipment monitoring and diagnostics of water supply systems; latest techniques and technologies of control and accounting of water consumption; repairs to the water supply networks of buildings [1].

The use of ultrasound technology for energy accounting, allows you to monitor any media: liquids, gases, vapors, etc. In this measurement, and data transmission can be carried out using ultrasonic communication channel in pipe networks. Then, an important point in the organization reliable ultrasonic communication channel, is to define the stable operation of the receiver and the transmitter of the acoustic wave, formed on the basis of piezoelectric sensors.

The aim is to study the piezoelectric sensor (PS) control circuit. In [2] the method of calculating programmed controls linear and nonlinear elastic mechanical systems with a finite number of degrees of freedom, described by means of the finite element method. However, more robust with respect to interference is Xia control feedback system [3].

Consider the methodology of control synthesis with feedback based on the solution of inverse problems of the dynamics of PS [4]. The differential equation in matrix form for a linear mechanical system has the following form:

$$Ax'' + Bx' + Cx = Nk, \quad (1)$$

where $A_{n \times n}$, $B_{n \times n}$, $C_{n \times n}$ – the structural stiffness matrix, mass and damping of the finite element model; $N_{n \times m}$ – electromechanical matrix of the piezoelectric transducer; $x_{n \times 1}$ – the vector of mechanical vibrations; $k_{m \times 1}$ – the vector of control actions [5].

Consider the case of aperiodic fluctuations in PS:

$$x^a(t) = \bar{x} \left(1 + \frac{\lambda}{\mu - \lambda} e^{\lambda t} + \frac{\mu}{\lambda - \mu} e^{\mu t} \right), \quad (2)$$

Where \bar{x} – the vector that defines the end position of the control system; $\lambda < 0$, $\mu < 0$ – indicators Exhibitor.

The measurement results of the control system at different points in time will

represent a vector:

$$\bar{z}_{l+1} = R_{l \times n} \cdot \bar{x}_{n+1}, \tag{3}$$

where $R_{l \times n}$ – transformation matrix.

Write the expression as:

$$\bar{x} = R^+ \bar{z} + (I - R^+ R) \bar{y}, \tag{4}$$

where R^+ – inverse matrix; I – identity matrix; $\bar{y} = J\bar{z}$ – arbitrary vector;

$J_{n \times k} = |j_{ij}|$ – unknown matrix constants.

Then $\bar{x} = [R^+ + (I - R^+ R)J]\bar{z} = D\bar{z}$.

We believe that the available measurement of z and \bar{z} , determine the acceleration of the velocity and displacement:

$$x^{na} = x'^a (\lambda + \mu) - x^a \lambda \mu + \bar{x} \lambda \mu,$$

$$x^{na} = (\lambda + \mu) D z' - \lambda \mu D \bar{z} + \lambda \mu \bar{x}.$$

$$(Nk)^a = (\lambda + \mu) A D z' - \lambda \mu A D \bar{z} + \lambda \mu A \bar{x} + B D z' + C D \bar{z}.$$

We set the value $u^a = E(Nk)^a$, where $E = [N^+ + (I - N^+ N)]H$, $H_{m \times n}$ – unknown matrix constants. Then the system PS feedback control takes the form (Fig. 1).

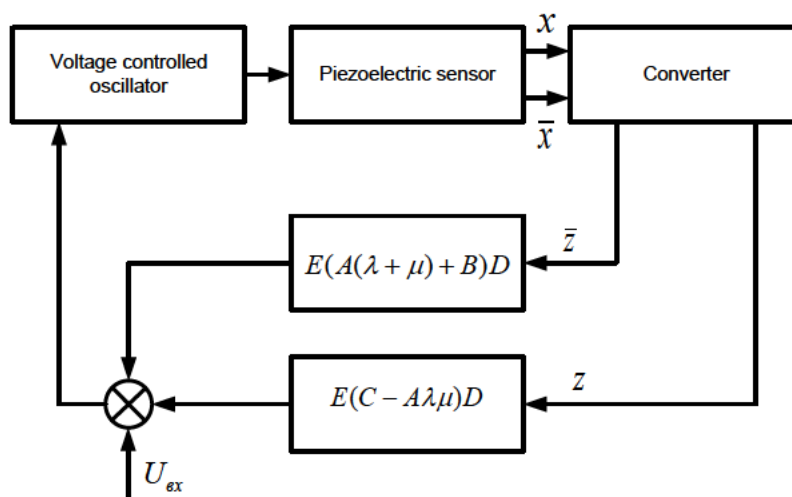


Fig.1 Control system with piezoelectric sensor with feedback

The input force is expressed as: $u_{ex}^a = EP\bar{x}$. The resulting equation PS control system with feedback for static equilibrium conditions:

$$Ax'' + (B - NE(A(\lambda + \mu) + B)RD)x' + (C - NE(C - \lambda\mu A)RD)\bar{x} = Nu_{ex}^a.$$



For $t = \infty$, $x = \bar{x}$: $(C - NE(C - \lambda\mu A)RD)\bar{x} = Nu_{ex}^a$, and $u_{ex}^a \approx N + (C - NE(C - \lambda\mu A)RD)\bar{x}$.

The expression of the transfer functions of the control panel management system introduce arbitrary matrix J and H . To determine the stability of the system we use Lyapunov method [6].

Write $Ax'' + (B - NE(A(\lambda + \mu) + B)RD)x' + (C - NE(C - \lambda\mu A)RD)\bar{x} = Nu_{ex}^a$ relative

column of the matrix phase variables $s = \begin{pmatrix} x \\ x' \end{pmatrix}$ as:

$$s' = \begin{pmatrix} 0 & 1 \\ -A^{-1}(C - NE(C - \lambda\mu A)RD) & -A^{-1}(B - NE(A(\lambda + \mu) + B)RD) \end{pmatrix} s = Gs$$

For stable PD control system, it is necessary that the real parts of the eigenvalues of $G_{2n \times 2n}$ values would be negative. Imagine G matrix as a function of the matrix component J and H a $G = G(j_{ij}, h_{ij})$.

$$[G - (\xi + i\tau)I](a + ib) = 0, \tag{5}$$

where ξ, τ – scalar, real and imaginary part of the eigenvalue;

a, b – the real and imaginary parts of the eigenvector.

Consider the real parts of the eigenvalues of ξ_j . In the case of the eigenvalue with positive real part $\xi > 0$, should change the parameters j_{ij} , so that it becomes negative. Since there is a nonlinear dependence of ξ on j_{ij} , the current changes in

proportion to Δj_{ij} determine the partial derivatives $\left(\frac{d\xi}{dj_{ij}} \right)$.

The partial derivatives are determined from the ratio: $[G - (\xi + i\tau)I](e + if) = 0$, where e and f the real and imaginary parts of the left eigenvector-line.

We equate to zero the real and imaginary parts of the full differential equations lefts:

$$\begin{cases} G\delta a - \xi\delta a + \tau\delta b - a\delta\xi + b\delta\tau + \frac{d}{dj}(Ga)\delta j = 0; \\ G\delta b - \xi\delta b - \tau\delta a - b\delta\xi - a\delta\tau + \frac{d}{dj}(Gb)\delta j = 0; \\ \delta eG - \xi\delta e + \tau\delta f - e\delta\xi + f\delta\tau + \frac{d}{dj}(eG)\delta j = 0; \\ \delta fG - \xi\delta f - \tau\delta e - f\delta\xi - e\delta\tau + \frac{d}{dj}(fG)\delta j = 0. \end{cases}$$

Then we convert to the form:

$$\begin{cases} (fb - ea)\delta\xi + (ea + fb)\delta\tau + \left[e\frac{d}{dj}(Ga) - f\frac{d}{dj}(Gb) \right] \delta j = 0; \\ -(eb + fa)\delta\xi + (fb - ea)\delta\tau + \left[f\frac{d}{dj}(Ga) + e\frac{d}{dj}(Gb) \right] \delta j = 0. \end{cases}$$

$$\delta\xi = \frac{1}{(fb - ea)^2 + (eb + fa)^2} \left[\left(f\frac{d}{dj}(Ga) + e\frac{d}{dj}(Gb) \right) (eb + fa) - \left(e\frac{d}{dj}(Ga) - f\frac{d}{dj}(Gb) \right) (fb - ea) \right] \delta j,$$

$$d = \frac{1}{(fb - ea)^2 + (eb + fa)^2} \left[\left(f\frac{d}{dj}(Ga) + e\frac{d}{dj}(Gb) \right) (eb + fa) - \left(e\frac{d}{dj}(Ga) - f\frac{d}{dj}(Gb) \right) (fb - ea) \right],$$

where d – vector determining the direction of change in values ξ .

Let the values of numbers in which the system is unstable, $\xi_{l_r} > -\varepsilon, r = 1, t$ and represent the values of these vectors in space J_{ij} :

$$d_{l_r} = \left(\frac{d\xi_{l_1}}{dj_{11}}, \frac{d\xi_{l_2}}{dj_{12}}, \dots \right).$$

The increment value of the parameter J_{ij} species $-\Delta j \text{sign} \left(\frac{d\xi_{l_r}}{dj_{ij}} \right)$ it will reduce the

value ξ , if all $\left(\frac{d\xi_{l_r}}{dj_{ij}} \right)$ have the same sign. Thus, it is possible to create conditions that enable to reduce the real part of the values at which the PS control system unstable, so long as they do not become negative.

Summary and Conclusions.

Thus, it is possible to synthesize the control system of PS, such where the transition between two static provisions of the PS would be carried out with the given speed and damping of the «parasitic» oscillations.



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Аннотация.

Рассмотрены схемы управления зондирующим пьезоэлектрическим датчиком (ПД), методика расчета программных управлений линейными и нелинейными упругими механическими системами с конечным числом степеней свободы, описываемыми при помощи метода конечных элементов. Показано, что при акустическом структурном мониторинге водопровода более надежными по отношению к помехам являются системы управления с обратной связью.

Ключевые слова: зондирующий датчик, акустика, пьезоэлектрическая керамика, мониторинг, структура, распространение, трубопровод, распределительные сети.

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Supervisor: c.t.s., as.prof. Zibrov V.A.

Article sent: 10/02/2017 of

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j12-018

DOI: 10.21893/2227-6920.2017-12.018

**PROBLEMS OF INFORMATION SUPPORT OF THE EDUCATIONAL
SERVICES QUALITY MANAGEMENT SYSTEM**

ПРОБЛЕМИ ІНФОРМАЦІЙНОГО ЗАБЕЗПЕЧЕННЯ СИСТЕМИ

УПРАВЛІННЯ ЯКІСТЮ ОСВІТНІХ ПОСЛУГ

c.e.s., as.prof. Gafiyak A.M. / к.е.н., доц. Гафіяк А.М.

ORCID: 0000-0001-8218-2140

c.t.s., as.prof. Kropyvnytskyi S.V. / к.т.н., доц. Кропивницький С.В.

Poltava National Technical Yuri Kondratyuk University, Pershotravnevyi avenue, 24, 36011

Полтавський національний технічний університет імені Юрія Кондратюка

Полтава, Першотравневий проспект, 24, 36011

Abstract. This article is devoted to the problem of creation of information support of the educational services quality management system. Problems and methods of effectiveness increasing of the innovating educational management were analyzed. Innovative educational management intended for improvement of the education quality was analyzed. System of education quality assessment and the possibility of its improvement were investigated. Information system intended for collection and analysis of quality educational services indexes of institutes of higher education was developed.

Key words: information society, information system, web-resource, software.

Introduction.

One of the main types of management is an innovating one. The essence of the innovating management consists in support of conditions for introduction of system changes into the work of educational institutions directed on their development and improvement their work. Effective innovating educational management directed on the improvement of education quality is a reliable mechanism of satisfaction of the requirements of educational services consumers and support of competitiveness of the educational institutions. Innovations in the theory and practice of the management and changes of functions of management system are important condition for the changeover to modernization of information system.



The main text.

Information and communication technologies of management of educational processes is an objective reality caused by the current stage of development of material-technical base of a society. Therefore, informatization is one of the important areas of substantive, methodological and organizational modernization of the education system. It is aimed at improving the quality, accessibility and efficiency of education closer to the realities of modern life. With the development of hardware and software of computers and communication technologies, the opportunity to significantly develop the field of creation of educational web resources [1,2].

Educational institution must plan and apply the processes of monitoring, measuring, analysis and improvement: to show the accordance of the educational services to their demands; to provide the accordance of the system quality management; to improve the effectiveness of the system quality management permanently. To realize the task (creation of a web-resource) the following software was selected: a) program packet of Denwer 3 which contains: web-server Apache 2 with support of SSL and mod-rewrite; script programming language PHP 5.3; data base management system of MySQL 5.1; phpMyAdmin- the panel of data base management of MySQL and also the script which simplifies the addition of a new MySQL user; b) the content management system of CMS Joomla 1.5.25. Its structure was developed in accordance with the hierarchical arrangement of the university subdivisions with the aim of easy-to-use navigation of the user through the site. So the faculties became sections, subdepartments became categories and tables of quality results of subdepartments activity became items or materials. Blocks of subdepartments contain all the subdepartments of the faculty, which they belong to, and every subdepartment will contain tables of results marked in the list of criteria of an internal subdepartment audit. The web-resource was created taking into account all demands, content management system was installed and adjusted. There is an opportunity to operate by its content easily. Easy-to-use and understandably enough user interface was created. Search module and modules of authorization and display of static site information were also added.



Summary and Conclusions.

The developed information system on tracing the quality of the educational services ensures obvious and prolonged subdepartments activity indexes observation and will also help to determine the main tasks and directions of work and development of educational activity. The developed system has easy-to-use structure and in case of need it may be added and modified. It ensures the necessary conditions and work results and it is quite ready to be applied.

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Анотація.

Стаття присвячена проблемі створення інформаційного забезпечення системи управління якістю освітніх послуг. Проаналізовано проблеми та методи підвищення ефективності інноваційного освітнього менеджменту. Проаналізовано інноваційний освітній менеджмент, спрямований на підвищення якості освіти. Досліджено систему оцінки якості освіти та можливості її покращення. Розроблено інформаційну систему для збору та аналізу якісних показників освітніх послуг вищих навчальних закладів.

Ключові слова: інформаційне суспільство, інформаційна система, веб-ресурс, програмні засоби.

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Article sent: 29/03/2017 of

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j12-029

DOI: 10.21893/2227-6920.2017-12.029

ANALYSIS OF THE NUMBER OF GRAY TONES IN THE PROCESS OF DISCRETE SCREENING

АНАЛІЗ КІЛЬКОСТІ РІВНІВ СІРОГО ПРИ ДИСКРЕТНОМУ РАСТРОВОМУ ПЕРЕТВОРЕННІ

Ph.D, Logoida M.M. / к. т. н., Логойда М. М.

Lviv Polytechnic National University, Department of Information
Technologies Publishing, Lviv, 12, Stepan Bandera street, 79013

Національний університет «Львівська Політехніка», Кафедра інформаційних
технологій видавничої справи, Львів, вул. С. Бандери, 12, 79013

Abstract. The article provides an analysis of the number of gray tones in the process of discrete screening. A well-known fact is that one of the quality indicators of raster image reproduction is the number of gray tones. An accurate reproduction elements traditional for printing of round and even square raster upon their discrete formation may be achieved subject to the high resolution of CtP devices. Increase of the accuracy of reproduction of the shape of a raster element results in the reduction of the tones of gray and the interval of tone rendering that significantly decreases the quality of raster prints. Therefore the analysis of the number of gray tones is an important and relevant task.

Key words: screening, raster element, raster cell, the number of gray tones, discrete reproduction.

Introduction.

Owing to the achievements in computer graphics the printing industry widely employs the methods of raster and vector graphics for processing texts and illustrations, methods of digital image processing, discrete raster transformation necessary for production and exposure of printing plates. However, raster transformation has its own peculiarity caused by the fact that discretization is achieved through the change of geometrical dimension of the elements while the carrier of information is the area of raster elements placed in a raster cell



corresponding to the tone of an image [1].

The main text.

The analysis of the number of gray tones has been done subject that raster elements have been formed by the lines of different length.

To begin with, that consider reproduction of the number of levels gray tones for discrete screen converting raster elements during the formation of various forms of raster elements within of raster cells for their given dimensions. Physically, the number of gray levels in the discrete raster transformation corresponds to the number of discrete levels of the area of the raster element placed in the cell raster given dimension. Under these conditions, the number of gray tones can be determined by mathematical expression characteristics of a discrete raster conversion. For example, the number of gray tones for raster elements of square (1), circular (2) and rhombic (3) shape is defined by the following expressions [2, 3]:

$$G_{C1} = \frac{N}{2} \quad (1)$$

$$G_{C2} = \frac{N}{2} + 2 \quad (2)$$

$$G_{C3} = N - 1, \quad (3)$$

where N – dimension of a raster cell.

Furthermore, it is necessary to add another tone of grey which corresponds e.g. to the paper. Consequently, the number of gray tones, which we can obtain at discrete conversion a raster, depends on the form of raster element. The bitmap element of square shaped has the smallest number of gray tones, in that time as the bitmap element of rhombic shape has the largest. The number of gray tones for raster elements of rhombic shape is twice more than for square raster elements. So by the number of gray tones, the raster element of rhombic shape is better [3].

Fig. 1. shows circuit of spatial reproduction for discrete transformation bitmap elements of square and rounded forms in the raster cell dimension of 10×10 .

The increase of the geometrical dimensions of raster elements results in gradual increase of the area of the elements. The number of degrees of area corresponds to



the number of the grey tones. The maximum number of possible areas for square raster elements is 5 levels, and round – 7 levels.

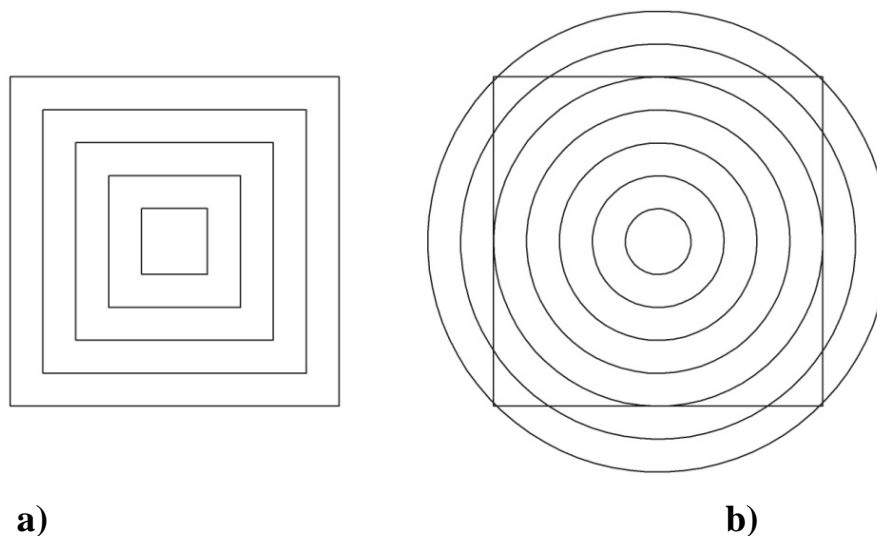


Fig. 1. The scheme spatial reproduction raster elements of different shapes: a – raster element of square shape, b – raster element of round shape

The table 1. shows the dependence of the number of gray tones on the dimensions of a raster cell for various forms of bitmap elements. In that case, when we have a small number of gray tones the phenomenon posterization will arise. It's the visually noticeable stepwise transition from one level of gray to another. This is especially noticeable for degree transition from light to darker tones, which affects the quality bitmap.

In the case when it comes to forming traditional for printing industry raster elements of square or round shapes, even at high dimensions of a cell of raster (e.g., 64×64 cells) can be obtained a relatively small number of gray tones (34) [3].

Following we consider the process the sequence forming of gray tones for the raster element of square shape (Fig. 1.a). The first the smallest square element consists of two horizontally placed strings and has an area of 4 dua (discrete unit of area). The second square element has four lines and has an area of 16 dua. The next, the third element comprises six square lines and has an area of 36 dua. We can similarly, define the number of lines and area of following square elements. To ensure the formation of raster elements we need to apply an even number of lines (2, 4, 6, 8, ..., n) with lengths of 2, 4, 6, 8, ..., n discrete units. Thus, in the process of formation of raster elements, the area of raster element will have following discrete



levels: 4, 16, 32, 64, 128, 256 dua.

Table 1

The number of gray tones depending on the dimension of raster cells for various forms of raster elements

The number of gray tones G_c						
Size Shape	4×4	6×6	8×8	16×16	32×32	64×64
Square	3	4	5	9	17	32
Rounded	5	6	7	11	19	34
Rhombic	4	8	8	16	32	64
Striped	16	36	64	256	1024	4096

Conclusions.

The more comprehensive results of the analysis of the number of gray tones depending on the dimensions of a raster cell upon the discrete formation of the element of a square, rounded, rhombic and striped shape are provided in table 1.

From these facts, one may conclude that the shape of the raster elements is the main factor that makes it impossible to obtain a greater number of gray tones in bitmap cell.

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Анотація.

В статті представлений аналіз кількості сірих сірого в процесі дискретного растрівання. Кількість рівнів сірого є одним із показників якості відтворення растрового зображення. Точне відтворення традиційних для поліграфії круглої і навіть квадратної



форми растрових елементів при їх дискретному формуванні може бути досягнута за умови високої роздільної здатності СтР пристроїв. Підвищення точності відтворення форми растрового елемента обумовлює зменшення кількості рівнів сірого та інтервалу тонопередачі, що значною мірою погіршує якість растрових відбитків. Тому аналіз кількості сірих тонів є важливим і актуальним завданням.

Ключові слова: растрування, растровий елемент, растрова комірка, кількість рівнів сірого, дискретне відтворення.

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Article sent: 29/03/2017

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**j12-013****DOI: 10.21893/2227-6920.2017-12.013**

**THE NON-STATIONARY 3D COMPUTER MODEL OF NON-
ISOTHERMAL FILTRATION OF NATURAL GAS FROM A
HETEROGENEOUS LAYER IN A MINING HOLE
НЕСТАЦИОНАРНАЯ 3D КОМПЬЮТЕРНАЯ МОДЕЛЬ
НЕИЗОТЕРМИЧЕСКОЙ ФИЛЬТРАЦИИ ПРИРОДНОГО ГАЗА ИЗ
НЕОДНОРОДНОГО ПЛАСТА В СКВАЖИНУ**

c.f.-m.s., as.prof. Zhuchenko S.V. / к.ф.-м.н., доц. Жученко С.В.

ORCID: 0000-0002-1946-7044

Kharkiv National University named after V.N. Karazin, Kharkiv, Sq. of Freedom, 4, 61077

Харьковский Национальный Университет им. В.Н. Каразина, , пл.Свободы 4, 61077

Abstract: The algorithm of decision of task is made, the program COMPUTER is created and debugged, results over of some calculable experiments are brought. The use of 3d computer model allows in earnest to extend the range of the decided tasks that, in particular, will help to estimate the total coefficient of resistance of layer with the different including and barriers. It is possible to study sloping layers.

Key words: gas-bearing layer, method of streams, calculable model, numeral experiments

Introduction

I had to deal with problems of the numerical simulation of natural gases filtration in the flat gas-bearing formations in the vicinity of the well since the mid-1980s. But back then opportunities of computers were very limited and therefore, in order to simplify the problem, flow in reservoir was assumed axially symmetrical with respect to the well, resulting in one or two-dimensional problems [3, 4, 5, 6]. This simplification in the formulation of the problem didn't allow simulating many real-life gas-bearing reservoirs, flow in which is essentially three-dimensional. The proposed non-stationary three-dimensional model allows us to simulate the gas flow near a series of impermeable barriers or to address cases when the well is drilled on the border of gas reservoir and the gas enters the well not on all sides in a circle, but



only from certain cylindrical sector. By setting the variable permeability of the reservoir at various surfaces of elementary volumes of the finite-difference network, one can model both impermeable walls and, on the contrary, areas of increased conduction. By manipulating the permeability of the elementary volumes' walls, if necessary, one can simulate not only planar reservoir.

Applying such a three-dimensional model and using ordinary personal computers, it is not possible yet to simulate the thermodynamics of reservoir for many months and years. However, to simulate the first few hours, even a day of reservoir work is quite real. This makes it possible to assess the total effective permeability of reservoir in the immediate vicinity of the well, which basically determines the field perspective for the future.

The primary data file of the presented program has tables of physical properties of many gases, which are part of the natural gases. To determine the specific gas, one must specify its composition and volume fraction of each component. Then, according to the "mix" rule, the program determines the physical properties of natural gas, which are used in the calculations. The dynamic viscosity and the gas super compressibility coefficient are given in a function of pressure P and temperature T . These functions are determined by interpolation of the experimental data tables, which are also set in the primary data file.

An algorithm for solving this problem is not original and is a variant of the method of "streams" [1, 2], which I also used in the solution of 2-dimensional gas filtration problem in the reservoir [5]. At this point, I needed to add one more variable in the computational formula, as well as create and debug effective, rapidly calculating computer program in the International System of Units. Nevertheless, the article provides a description of an algorithm for solving the problem and brings some computational experiments carried out with the help of the proposed program. In the future, this program will be called "PLAST_3D".

I. Algorithm for solving of problem of gas filtration in a reservoir and a well.

We consider a three-dimensional thermo hydrodynamics computer model that

models a mode of non-isothermal non-stationary filtration of natural gas in a reservoir area and a well area. It is assumed that the horizontal layer with an effective thickness HP is situated at Z^0 depth. The well is drilled vertically and fully penetrates into the reservoir. Gas enters in the well through its side surface. The flow in the well is assumed as one-dimensional and is modeled only in the reservoir area. To obtain the original finite-difference equations in the reservoir, cylindrical coordinates $0r, 0z, 0f$ are introduced. Axis z coincides with symmetry axis of the well and is directed vertically upward.

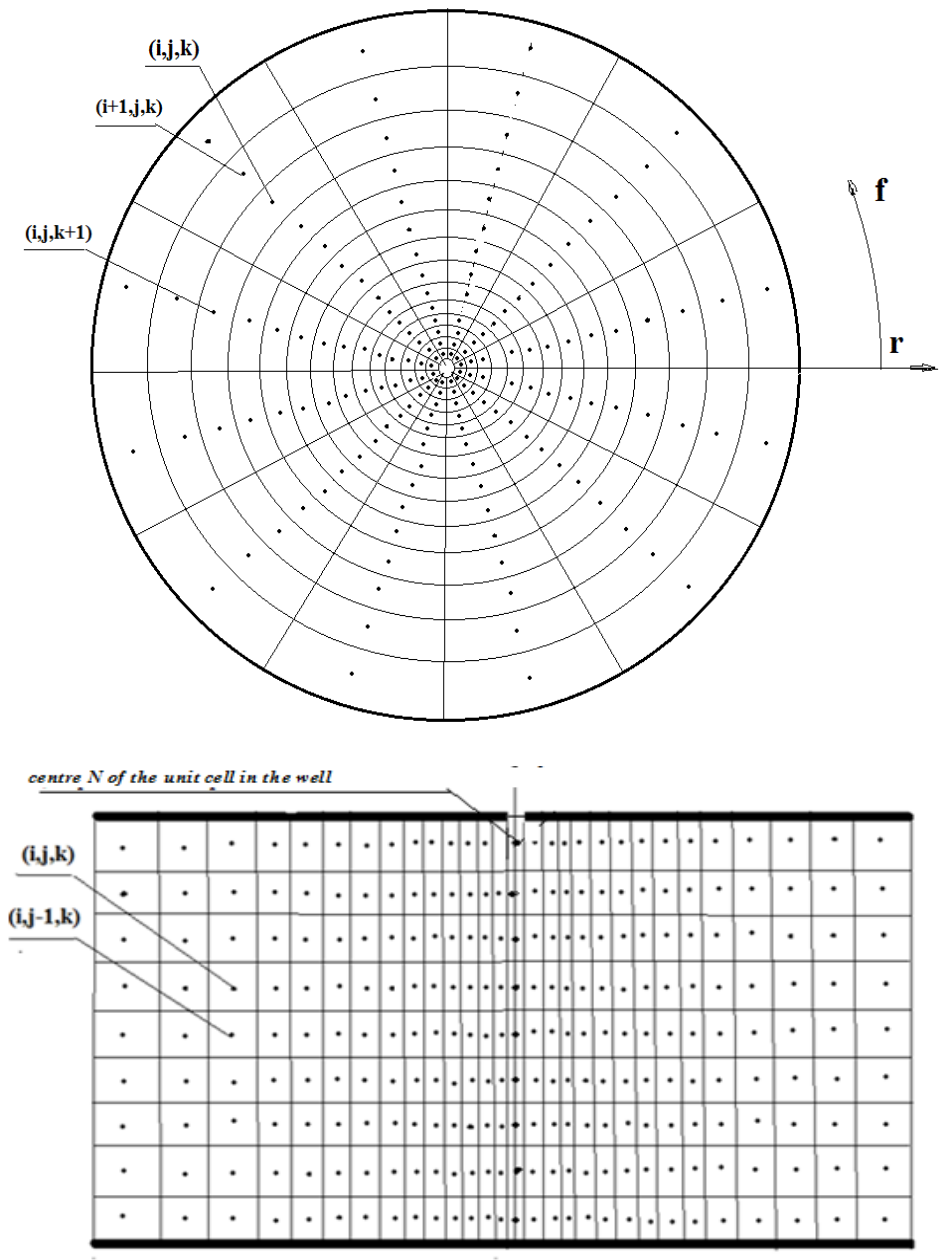


Fig. 1 Example of computing zone partitioning into elementary volumes in the reservoir



Computing area in the reservoir is a circular cylinder with z axis and R_0 radius. Through a family of coordinate planes and cylindrical surfaces, this area and the well in the reservoir area are divided into elementary volumes. Fig. 1 shows an example of the reservoir partitioning into elementary volumes in the well supply zone as well as the method of their numbering. Auxiliary points below are not shown, but their position is obvious.

I.1. Derivation of the basic integral equations of balance

By analogy with the method of "streams" [1, 2] for each elementary volume in the reservoir and the well integral relations are made that follow from the laws of mass, momentum and complete internal energy of the gas conservation. Thus, for each elementary volume of the reservoir, we have:

Continuity equation:

$$m \int_{\Omega_{i,j,k}} \frac{\partial \rho}{\partial t} d\Omega + \int_{S_{i,j,k}} \rho (\vec{V}, \vec{n}) dS = 0 \quad (1)$$

Where $S_{i,j,k}$ – is the surface of the elementary volume $\Omega_{i,j,k}$ with number (i,j,k) :

$(i = 1, \dots, M; j = 1, \dots, N; k = 1, \dots, L)$;

t – time; m – porosity of reservoir solid phase, assumed to be constant over the entire range of calculations; ρ – density of the gas;

$\vec{n} = (n_r, n_z, n_k)$ – Vector of outward normal to the surface of the elementary volume $\Omega_{i,j,k}$;

k ;

$\vec{V} = (v_r, v_z, v_k)$ – Vector of flow rate filtration.

Vector equation of balance of movement amount momentum:

$$\int_{\Omega_{i,j,k}} \frac{\partial (\rho \vec{W})}{\partial t} d\Omega + \int_{S_{i,j,k}} (\rho \vec{W}) (\vec{V}, \vec{n}) dS = - \int_{S_{i,j,k}} P \vec{n} dS - \int_{\Omega_{i,j,k}} \rho g \vec{e}_z d\Omega - \int_{\Omega_{i,j,k}} F_{i,j,k} \vec{V} dS \quad (2)$$

Where $\rho \vec{W} = (\rho w_r, \rho w_z, \rho w_f)$ – is vector of movement amount momentum;

$\rho \vec{V} = m \rho \vec{W}$;

P – Pressure;



$$F_{i,j,k} = \begin{pmatrix} F_{i,j,k}^{rr} & 0 & 0 \\ 0 & F_{i,j,k}^{zz} & 0 \\ 0 & 0 & F_{i,j,k}^{ff} \end{pmatrix}$$

Matrix of volume resistance coefficients in $\Omega_{i,j,k}$;

$$F_{i,j,k}^{rr} = \mu_{i,j,k} / K_{i,j,k}^{rr}, \quad F_{i,j,k}^{zz} = \mu_{i,j,k} / K_{i,j,k}^{zz}, \quad F_{i,j,k}^{ff} = \mu_{i,j,k} / K_{i,j,k}^{ff};$$

$\mu_{i,j,k}$ - Coefficient of dynamic viscosity in the elementary volume $\Omega_{i,j,k}$;

$K_{i,j,k}^{rr}, K_{i,j,k}^{zz}, K_{i,j,k}^{ff}$ - Reservoir permeability in the elementary volume $\Omega_{i,j,k}$ in directions r, z, f , respectively;

g - Acceleration of gravity;

\vec{e}_z - Unit vector directed along the axis z .

The basis of the derivation of energy conservation equation is a differential writing of the energy equation for compressible fluid flows in porous media [2]:

$$\left(\rho \vec{V}, \text{grad} \left(gz + |\vec{W}|^2 / 2 + H \right) \right) + m \rho \left(\frac{\partial}{\partial t} \left(gz + |\vec{W}|^2 / 2 \right) + T \frac{\partial S}{\partial t} \right) = q_T + W_t^f, \tag{3}$$

z - is vertical coordinate;

H - Enthalpy;

T - Flow temperature;

S - Entropy;

W_t^f, q_T - Specific additional mechanical and thermal powers supplied from the outside, respectively.

If the formation is generally stationary, that is $\frac{\partial z}{\partial t} = 0$ and $W_t^f \approx 0$, and the flow

rates \vec{W} are small of the first order $(|\vec{W}|^2 \approx 0)$, which is usually for filtering in the elastic mode, for sub-horizontal ($z \approx \text{const}$) flows from (3) we obtain the simplified heat inflow equation:



$$q_T = \rho \left[(\vec{V}, \text{grad } H) + mT \frac{\partial S}{\partial t} \right] \quad (4)$$

Substituting in (4) differential thermodynamics relations

$$dH = C_p (dT + \varepsilon_T dP),$$

Where C_p – isobaric specific heat of the gas,

$$\varepsilon_T = \left(\frac{\partial T}{\partial P} \right)_H = \frac{1}{C_p} \left[V - T \left(\frac{\partial V}{\partial T} \right)_P \right] - \text{Joule-Thompson coefficient,}$$

$$V = \frac{1}{\rho} - \text{Specific volume,}$$

$$TdS = C_p (dT - \eta_T dP),$$

$$\eta_T = \left(\frac{\partial T}{\partial P} \right)_S = \frac{T}{C_p} \left(\frac{\partial V}{\partial T} \right)_P - \text{Adiabatic heat factor defines heat of the outer (with respect to the flow in the pore space) heat transfer in the form of:}$$

$$q_T = C_p (\rho \vec{V}, \text{grad } T + \varepsilon_T \text{grad } P) + m\rho C_p \left(\frac{\partial T}{\partial t} - \eta_T \frac{\partial P}{\partial t} \right). \quad (5)$$

Let T_s – be the temperature of the solid phase of the porous medium. Local thermal equilibrium $T = T_s$ with sufficient accuracy is observed for slow filtration flows in the ordinary areas of natural porous reservoirs provided sufficiently small size of the medium element. In these cases, according to Fourier's law, the heat balance equation for the saturated porous medium has the form:

$$\text{div}(\Lambda \text{grad } T) = C_s \frac{\partial T}{\partial t} + q_T, \quad (6)$$

Here Λ – is thermal conductivity of the medium as a whole; C_s – heat capacity of the solid phase; q_T – thermal power spent for gas heating.

According to [3, 4], the coefficient of saturated porous medium can be considered with sufficient accuracy to be independent of flow rate.

Combining (5) and (6), provided that $\Lambda = \text{const}$, we get:

$$C_0 \frac{\partial T}{\partial t} - m\eta_T \rho C_p \frac{\partial P}{\partial t} = \Lambda \text{div grad } T - C_p (\rho \vec{V}, [\text{grad } T + \varepsilon_T \text{grad } P]) \quad (7)$$



$C_0 = C_s + m\rho C_p$ - is heat capacity of the saturated reservoir.

Equation (7) we integrate according to the elementary volume $\Omega_{i,j,k}$. Using the relation

$$(\vec{V}, grad T) = div(T\vec{V}) - T div\vec{V}$$

and the approximatereletion

$$\int_{\Omega_{i,j,k}} T div\vec{V} d\Omega = T_{i,j,k} \int_{\Omega_{i,j,k}} div\vec{V} d\Omega,$$

Using the Gauss's theorem after obvious transformations we obtain the energy conservation equation in integral form:

$$\int_{\Omega_{i,j,k}} \left(C_0 \frac{\partial T}{\partial t} - m\eta_T \rho C_p \frac{\partial P}{\partial t} \right) d\Omega = \Lambda \int_{S_{i,j,k}} \frac{\partial T}{\partial n} dS - \int_{S_{i,j,k}} C_p (T + \varepsilon_T P) (\rho \vec{V}, \vec{n}) dS + C_p (T_{i,j,k} + \varepsilon_T P_{i,j,k}) \int_{S_{i,j,k}} (\rho \vec{V}, \vec{n}) dS \tag{8}$$

A system consisting of equations (1), (2) and (8) is used to solve thermo hydrodynamics problems of filtration flows in the reservoir. To close the system we use the equation of a real gas state

$$P = Z \rho RT \tag{9}$$

Z - is super compressibility coefficient of natural gas; R - gas constant.

I.2. Derivation of finite-difference equations in the reservoir

The system of equations (1), (2), (8) and (9) can be solved approximately. In this case all the integrals in them by the method of "boxes" are replaced by integral sums, and the derivatives are approaching the method of finite differences. The result is a system of conservative finite-difference equations with an explicit scheme in time.

In this case the continuity equation (1) takes the form:

$$m \frac{\rho_{i,j,k}^{n+1} - \rho_{i,j,k}^n}{\Delta t} \Omega_{i,j,k} = \left[(\rho V_r S_r)_{i+\frac{1}{2},j,k}^n - (\rho V_r S_r)_{i-\frac{1}{2},j,k}^n + (\rho V_z S_z)_{i,j-\frac{1}{2},k}^n - (\rho V_z S_z)_{i,j+\frac{1}{2},k}^n + (\rho V_f S_f)_{i,j,k-\frac{1}{2}}^n - (\rho V_f S_f)_{i,j,k+\frac{1}{2}}^n \right] \tag{10}$$



Here the derivative of the density according to time in the center of the cell $\Omega_{i,j,k}$ is approaching by the formula finite difference of first order of accuracy, i.e.

$$\left(\frac{\partial \rho}{\partial t}\right) \approx \frac{\rho_{i,j,k}^{n+1} - \rho_{i,j,k}^n}{\Delta t} \tag{11}$$

Where n - is sacrificial layer number; S_r, S_z, S_f - surfaces of elementary volumes edges $\Omega_{i,j,k}$, perpendicular to axes r, z and f , respectively.

The density ρ on the surfaces S_r, S_z, S_f , i.e. in the nodes of a type $(i + \frac{1}{2}, j, k), (i, j - \frac{1}{2}, k), (i, j, k + \frac{1}{2})$ etc. in accordance with the method of "flows" [2] is determined by asymmetric formulas of second order linear extrapolation of accuracy from the nodes with integer indices, for example:

$$\rho_{i+\frac{1}{2},j,k} \approx \begin{cases} [(x+y)\rho_{i,j,k} - x\rho_{i-1,j,k}] / y, & \text{npu } (V_r)_{i+\frac{1}{2},j,k} < 0 \\ [(x+y)\rho_{i+1,j,k} - x\rho_{i+2,j,k}] / y, & \text{npu } (V_r)_{i+\frac{1}{2},j,k} \geq 0 \end{cases} \tag{12}$$

We assume that when the gas flow is directed to the well, then $V_r > 0$. That's why in the first formula (12) x - is the distance between nodes (i, j, k) and $(i + \frac{1}{2}, j, k)$, y - between nodes $(i - 1, j, k)$ and (i, j, k) . Similarly, in the second formula (12) when the rate $V_r \geq 0$, x - the distance between nodes $(i + 1, j, k)$ and $(i + \frac{1}{2}, j, k)$, y - between nodes $(i + 1, j, k)$ and $(i + 2, j, k)$.

After obvious transformations the continuity equation (10) takes the final form:

$$\rho_{i,j,k}^{n+1} = \rho_{i,j,k}^n + \Delta t \left[(\rho V_r S_r)_{i+\frac{1}{2},j,k}^n - (\rho V_r S_r)_{i-\frac{1}{2},j,k}^n + (\rho V_z S_z)_{i,j-\frac{1}{2},k}^n - (\rho V_z S_z)_{i,j+\frac{1}{2},k}^n + (\rho V_f S_f)_{i,j,k-\frac{1}{2}}^n - (\rho V_f S_f)_{i,j,k+\frac{1}{2}}^n \right] / (m\Omega_{i,j,k}) \tag{13}$$

Normal component of flow rate vector to the surfaces S_r , that is $(V_r)_{i-\frac{1}{2},j,k}^n$ and $(V_r)_{i+\frac{1}{2},j,k}^n$, to the surfaces S_z , that is $(V_z)_{i,j-\frac{1}{2},k}^n$ and $(V_z)_{i,j+\frac{1}{2},k}^n$, as well as to the surfaces S_f , that is $(V_f)_{i,j,k-\frac{1}{2}}^n$ and $(V_f)_{i,j,k+\frac{1}{2}}^n$ are determined from the finite-difference approximations of the vector equation of balance of movement amount momentum (2). However, in flows



studied by us contributions of inertial and convective forces (the first and the second terms in the equation (2), respectively) as compared to the volume resistance forces (the last term in (2)) is low, therefore these forces are negligible. As a result, the formula (2) will be simplified so that with the help of its finite-difference analogue an analytical expression for the velocity vector can be obtained. It should be noted that the direct formula approximation (2) allows to obtain a rate vector in the cell center $\Omega_{i,j,k}$. In the calculations, however, interest lay in the normal components of the rate vectors to the surfaces S_r , S_z and S_f . Therefore for the determination of the normal components of the rate vector V_r is it is useful to consider cells centered at the nodes $(i + \frac{1}{2}, j, k)$ and $(i - \frac{1}{2}, j, k)$, for determining the normal rate vector components V_z - cells centered at the nodes $(i, j + \frac{1}{2}, k)$ and $(i, j - \frac{1}{2}, k)$, and for rate copinents V_f - cells centered at the nodes $(i, j, k + \frac{1}{2})$ and $(i, j, k - \frac{1}{2})$. As a result, passing to finite differences and solving these relations with respect to the components of the rate vector, we have, for example, such expressions:

$$(V_r)_{i+\frac{1}{2},j,k}^n \approx \left(\frac{K^r}{\mu^n} \right)_{i+\frac{1}{2},j,k} \left(\frac{P_{i+1,j,k}^n - P_{i,j,k}^n}{r_{i+1} - r_i} \right) \tag{14}$$

$$(V_z)_{i,j-\frac{1}{2},k}^n \approx \left(\frac{K^z}{\mu^n} \right)_{i,j-\frac{1}{2},k} \left[-\rho_{i,j-\frac{1}{2},k}^n g + \left(\frac{P_{i,j-1,k}^n - P_{i,j,k}^n}{z_j - z_{j-1}} \right) \right] \tag{15}$$

$$(V_f)_{i,j,k-\frac{1}{2}}^n \approx \left(\frac{K^f}{r_i \mu^n} \right)_{i,j,k-\frac{1}{2}} \left(\frac{P_{i,j,k-1}^n - P_{i,j,k}^n}{f_{i+1} - f_i} \right) \tag{16}$$

Similarly to the finite-difference type, energy conservation equation is converted (8), namely: according to the formula (11) approaching the partial derivatives with respect to time to the temperature $\left(\frac{\partial T}{\partial t} \right)_{i,j,k}$ and pressure $\left(\frac{\partial P}{\partial t} \right)_{i,j,k}$. Size of normal to the surface $S_{i,j,k}$ of the first temperature derivative of the formula approximates according to a finite difference formula of first order accuracy, like:



$$\left(\frac{\partial T}{\partial n}\right)_{i+\frac{1}{2},j,k} = \left(\frac{\partial T}{\partial r}\right)_{i+\frac{1}{2},j,k} \approx \frac{T_{i+1,j,k} - T_{i,j,k}}{r_{i+1} - r_i}, \quad \left(\frac{\partial T}{\partial n}\right)_{i,j,k+\frac{1}{2}} = \frac{1}{r_i} \left(\frac{\partial T}{\partial f}\right)_{i,j,k+\frac{1}{2}} \approx \frac{1}{r_i} \frac{T_{i,j,k+1} - T_{i,j,k}}{f_{i+1} - f_i}. \quad (17)$$

The pressure value P at the surface $S_{i,j,k}$ is determined by linear interpolation formula second order accuracy, for example:

$$P_{i,j+\frac{1}{2},k} \approx (xP_{i,j,k} + yP_{i,j+1,k})/(x + y), \quad (18)$$

Where x - is distance between the nodes $(i, j + \frac{1}{2}, k)$ and $(i, j + 1, k)$,

y - Distance between the nodes $(i, j + \frac{1}{2}, k)$ and (i, j, k) .

Temperatures T on the surface $S_{i,j,k}$ are determined by the asymmetrical formulas of linear extrapolation of the second order accuracy from the nodes with integer indices, as is done in the formulas (12) for the density. The resulting finite difference expression for the derivatives and the formula of linear interpolation are substituted in integral amounts approximating in the equation (8) integrals by the volume $\Omega_{i,j,k}$ and surface $S_{i,j,k}$. After obvious transformations we obtain the required finite-difference expression:

$$\begin{aligned} C_0 T_{i,j,k}^{n+1} - m \eta_T \rho_{i,j,k}^{n+1} C_P P_{i,j,k}^{n+1} &= C_0 T_{i,j,k}^n - m \eta_T \rho_{i,j,k}^n C_P P_{i,j,k}^n + \\ + \Delta t \left\{ \Lambda \left[\left(\frac{\partial T}{\partial r} S_r\right)_{i+\frac{1}{2},j,k}^n - \left(\frac{\partial T}{\partial r} S_r\right)_{i-\frac{1}{2},j,k}^n + \left(\frac{\partial T}{\partial z} S_z\right)_{i,j+\frac{1}{2},k}^n - \left(\frac{\partial T}{\partial z} S_z\right)_{i,j-\frac{1}{2},k}^n + \frac{1}{r_i} \left(\frac{\partial T}{\partial f} S_f\right)_{i,j,k+\frac{1}{2}}^n - \right. \right. \\ - \left. \left. \frac{1}{r_i} \left(\frac{\partial T}{\partial f} S_f\right)_{i,j,k-\frac{1}{2}}^n \right] + C_P \left[(T + \varepsilon_P P)_{i+\frac{1}{2},j,k}^n (\rho V_r S_r)_{i+\frac{1}{2},j,k}^n - (T + \varepsilon_P P)_{i-\frac{1}{2},j,k}^n (\rho V_r S_r)_{i-\frac{1}{2},j,k}^n + \right. \right. \\ + (T + \varepsilon_P P)_{i,j-\frac{1}{2},k}^n (\rho V_z S_z)_{i,j-\frac{1}{2},k}^n - (T + \varepsilon_P P)_{i,j+\frac{1}{2},k}^n (\rho V_z S_z)_{i,j+\frac{1}{2},k}^n + (T + \varepsilon_P P)_{i,j,k-\frac{1}{2}}^n (\rho V_f S_f)_{i,j,k-\frac{1}{2}}^n - \\ - (T + \varepsilon_P P)_{i,j,k+\frac{1}{2}}^n (\rho V_f S_f)_{i,j,k+\frac{1}{2}}^n \left. \right] - (T + \varepsilon_P P)_{i,j,k}^n * \left[(\rho V_r S_r)_{i-\frac{1}{2},j,k}^n - (\rho V_r S_r)_{i+\frac{1}{2},j,k}^n + \right. \\ \left. + (\rho V_z S_z)_{i,j-\frac{1}{2},k}^n - (\rho V_z S_z)_{i,j+\frac{1}{2},k}^n + (\rho V_f S_f)_{i,j,k-\frac{1}{2}}^n - (\rho V_f S_f)_{i,j,k+\frac{1}{2}}^n \right] \left. \right\} / \Omega_{i,j,k} \quad (19) \end{aligned}$$

I.3. Derivation of initial finite-difference equations in the well

Flow in the well is assumed dimensional. Finite difference equation for the



momentum is similar to the equation for the z-th component of the momentum vector in the reservoir (see Equation 2). The flow in the well during well testing and production process can be assumed as a quasi-stationary, so the first term of the equation (2) is not taken into account. Resistance to the flow in the well is taken into account, but it is much smaller than in the reservoir, so the convective forces must be considered too (in the equation (2) they are the second term).

Finite difference approximation of steady momentum balance equation, composed for the elementary volume in the well is:

$$\left[(\rho_c V_c^2)_{j-\frac{1}{2}} - (\rho_c V_c^2)_{j+\frac{1}{2}} + (P_c)_{j-\frac{1}{2}} - (P_c)_{j+\frac{1}{2}} \right] - [(\rho_c)_j g + f_c (\rho_c V_c)_j] h = 0, \quad (j = 1, \dots, N), \tag{20}$$

ρ_c^- – is gas density in the well;

V_c^- – Gas velocity in the well;

P_c^- – Gas pressure in the well;

f_c^- – Coefficient of volume resistance in the well;

h – Length of the unit cell in the well.

Gas consumption at the boundaries J of wall's elementary cell at arbitrary times a determined from the equation of mass conservation, composed for such a cell:

$$(\rho_c V_c S_c)_{j+\frac{1}{2}} = (\rho_c V_c S_c)_{j-\frac{1}{2}} + \sum_{k=1}^L (\rho V_r S_r)_{0,j,k} \tag{21}$$

Here $(\rho_c V_c S_c)_{\frac{1}{2}} = 0$ – is zero flow in a dead-end zone of the well with $j=1$,

$\sum_{k=1}^L (\rho V_r S_r)_{0,j,k}$ – total gas flow rate at the reservoir boundary – well, resulting from solution in the reservoir.

At the reservoir-well boundary adiabatic expansion mode is modeled by, so the equation exercising the "mix" rule for the heat flow across the border would be:

$$(\rho_c V_c S_c T_c)_{j+\frac{1}{2}} = (\rho_c V_c S_c T_c)_{j-\frac{1}{2}} - \sum_{k=1}^L \left(\frac{P_{1,j,k}}{(P_c)_j} \right)^\alpha (\rho V_r S_r T)_{\frac{1}{2},j,k} \tag{22}$$

Here $(T_c)_{j-\frac{1}{2}}$ – is inlet temperature and $(T_c)_{j+\frac{1}{2}}$ – outlet temperature of j unit cell in



the well, $\alpha = (C_v - C_p) / C_p$.

I.4. Conditions at the boundary

The upper and lower boundaries of the reservoir are assumed impermeable, thus

$$(V_z)_{i,\frac{1}{2},k}^n = (V_z)_{i,N+\frac{1}{2},k}^n = 0, \quad i = 1, \dots, M; \quad k = 1, \dots, L, \quad (23)$$

and consequently, all the convective components in the formulas (13) and (19) in those locations are zero, and through these boundaries heat transfer occurs only by Fourier's law of heat conduction. To calculate the normal to the boundary derivative for the temperature according to the formula similar to the formula (17), it is necessary to set the temperature of the auxiliary nodes with numbers $(i,0,k)$ and $(i,N+1,k)$, $i = 1, \dots, M; \quad k = 1, \dots, L$. Temperature in these places is considered to be equal to a temperature of the undisturbed formation. Thermal conductivity coefficient Λ at the wall, apparently, must be different from the same coefficient within the reservoir, because it includes the thermal conductivity of not only saturated porous medium, but also of the solid phase.

On a cylindrical surface of radius R_0 , limiting wells feeding area, two options of boundary conditions are modeled:

a) Surface coincides with the boundary of the gas reservoir, and then here it is an impermeable boundary, where $(V_r)_{M+\frac{1}{2},j,k}^n = 0, \quad j = 1, \dots, N; \quad k = 1, \dots, L$, leading to the conditions similar to the conditions at the upper and lower boundaries of the reservoir.

б) Only part of gas reservoir located in the vicinity of the well is simulated. Then, auxiliary nodes $(M+1, j, k)$, $j = 1, \dots, N; \quad k = 1, \dots, L$ keep data of the undisturbed reservoir and computation continues until its difference from the data in the basic nodes with numbers (M, j, k) , $j = 1, \dots, N; \quad k = 1, \dots, L$ will not exceed a predetermined threshold. Then computation is either terminated or additional elementary volumes are added, up to some new value R_0 , that is, the computation area is increased and the



computation continues.

At the boundary of the reservoir and the well are located auxiliary reservoir nodes numbered $(0, j, k)$, $j = 1, \dots, N$; $k = 1, \dots, L$. When the well works in gas pumping mode from the reservoir, the pressure at these nodes is set equal to the pressure in the respective nodes of the well, i.e.

$$P_{0,j,k} = (P_c)_j, \quad (24)$$

And both density $\rho_{\frac{1}{2},j,k}$ and temperature $T_{\frac{1}{2},j,k}$ of the gas mixture in the reservoir-well boundary defined by the second formula (12). When the well pumps gas into the reservoir, together with the formula (24) for pressure, density and temperature at the

boundary are determined from the relations: $\rho_{\frac{1}{2},j,k} = (\rho_c)_j$ and $T_{\frac{1}{2},j,k} = (T_c)_j$.

Here $(\rho_c)_j$ is density and $(T_c)_j$ temperature of the gas at the well node, which is located opposite the reservoir cell numbered j . In the case where the well is turned off and the program operates in mode of pressure restoration in the formation, on the subsidiary nodes located along the reservoir-well boundary, the same pressure is set as in the nearest cells in the reservoir. This condition ensures the impermeability of the reservoir-well boundary.

I.5. Solution algorithm

As an example, we'll consider the method of algorithms for the case where the button of the well is given gas consumption in a time function, that is $Q=Q(t)$ (kg/s). Most often this consumption is assumed constant and equal to Q (kg/s).

The program work is carried out in the following sequence:

1. In the file "nachdat" we introduce all the geometrical parameters of the reservoir and the well, modes of iteration process, gas mixture composition and volume fraction of each gas in the mixture. The file "nachdat" also contains the main physical properties required of gases which are included in natural gas and pilot data, which is used to determine the coefficients of super compressibility factor and dynamic viscosity of the gas mixture in the function of pressure and temperature. All



original data of the program are given in the International System of Units.

2. Computation area in the reservoir and the well is divided into elementary volumes, their numbering is held. We enter values for the constants of all elementary volumes surfaces. Thereby, real-bearing reservoir is simulated, including all areas of complete or partial impermeability therein.

3. For all nodes initial flow data is entered for P – pressure, T – temperature and ρ – density. In this example, we assume that the computation is carried out, starting with the unperturbed reservoir mode, so the vector of flow rate is zero everywhere.

4. Along the well, the pressure is set, which provides a small pressure drop, beginning at an arbitrary, as compared with the reservoir.

5. According to the formula (24) pressure on the auxiliary reservoir nodes numbered $(0, j, k)$, $j = 1, \dots, N$; $k = 1, \dots, L$ is determined.

6. Using the formula of interpolation of the experimental data from “nachdat” file, we determine the values of super compressibility and dynamic viscosity coefficients of the gas mixture in all unit cells of the reservoir and the well.

7. According to the formulas (14), (15) and (16) gas flow rates distribution at all the boundaries of the elementary volume in the reservoir is determined.

8. At the boundaries of all the elementary volumes in the reservoir by the formulas similar to (12) we determine values of ρ – density and T – temperature, by the formulas as in (17), compute values of the normal derivatives for the temperature, and by the formulas as in (18), - the pressure of the gas mixture.

9. In the formulas (13) and (19) we make a single step of iteration process for gas mixture energy and density. Using equation of real gas state (9) and freshly received values of energy and density of the gas mixture, we determine its pressure and temperature in the center of each unit cell of the reservoir.

10. In formulas (21) and (22) is determined by flow rate and gas temperature distribution at a time along the well. At a certain flow rate using the formula (20) is determined by the distribution of the pressure of the gas mixture along the well.

Just obtained consumption $(\rho_c V_c S_c)_{N+\frac{1}{2}}$ at the bottom of the well is compared



with a consumption predetermined by the problem Q . If $\left|(\rho_c V_c S_c)_{N+\frac{1}{2}} - Q\right| < \varepsilon$, it is considered that in the pressure distribution at the bottom of the well is detected properly and it is possible to carry out the next step of the iterative process, for this calculation are transmitted in 5 pare. Here ε - defined by the condition of the problem flow accuracy for computation.

Otherwise, the pressure $(P_c)_{N+\frac{1}{2}}$ at the bottom of the well is specified by the formula:

$$(P_c)_{N+\frac{1}{2}} = (P_c)_{N+\frac{1}{2}} + DP * \text{sign}((\rho_c V_c S_c)_{N+\frac{1}{2}} - Q) \quad (25),$$

$DP > 0$ – is experimentally chosen constant.

It should be noted that if at this time step the amendment sign, changing the pressure at the bottom of the well, compared with the previous step has changed, before using the formula (25) constant is halved.

11. Equation (20) is solved for $(P_c)_{j-\frac{1}{2}}$ and using $(P_c)_{N+\frac{1}{2}}$ as the initial, distribution of the pressure in the well is determined. After that the next step of the iteration process is held, for which commutation is transferred to the (5) pare.

12. Commutation continues until a specified time set by the problem condition.

II. Computational experiments

II.1. Computation modeling axially symmetric flows in the reservoir

To assess the reliability of the “PLAST_3D” program we compared results with the results of numerical experiments obtained by other authors. For this purpose we used the results presented in the second chapter of Zaripova K.R. thesis [6]. There, as an initial data for the computation, were used the following characteristics of a gas well research in the Urengoy gas condensate field [7]: gas flow rate of 1042 thousand m³/day; reservoir pressure $P = 12$ MPa, and temperature $T = 301.25$ °K before the start of the well; reservoir effective thickness $h = 20$ m, feed loop radius $R = 500$ m, permeability $k = 0,04$ mm², porosity $m = 0,3$, volumetric heat capacity of the reservoir solid phase $C_s = 525$ kcal / (m³ °C), thermal conductivity of the



reservoir $\lambda = 2 \text{ kcal}/(\text{m}^{\circ}\text{h}^{\circ}\text{C})$. Isobaric heat capacity of gas: $C_p = 0,6911 \frac{\text{KCal}}{\text{kg}^{\circ}\text{C}}$, thermal conductivity coefficient: $\lambda = 0,0544 \frac{\text{KCal}}{\text{m}^{\circ}\text{h}^{\circ}\text{C}}$. Coefficient of dynamic gas viscosity: $\mu = 0,0156 \text{ mPa}\cdot\text{s}$ and the coefficient of gas supercompressibility $Z = 0,8420$. In the thesis, these characteristics are assumed to be constant and equal to their values at the pressure and temperature of the undisturbed reservoir.

In the second chapter of this thesis is considered the problem of one-dimensional non-isothermal gas filtration to the perfect well. These problems have been solved in several ways. Charts for the dynamics of pressure and temperature at the bottom of the well, obtained there, are shown in Figures 2 and 4. For the same initial data were carried out computations by the “PLAST_3D” program. It solved a 2-dimensional problem. As for the reservoir width, a uniform network of 10 points was used and as for the radius, an irregular network of 70 points was used. Due to the expected axial symmetry of the reservoir on the corner it was used only one layer of the elementary volumes. 1 hour of the reservoir work is modeled in less than 4 minutes of program computing. Charts of pressure and temperature calculations at the bottom of the well built on the results of the program “PLAST_3D” are shown in Figures 3 and 5.

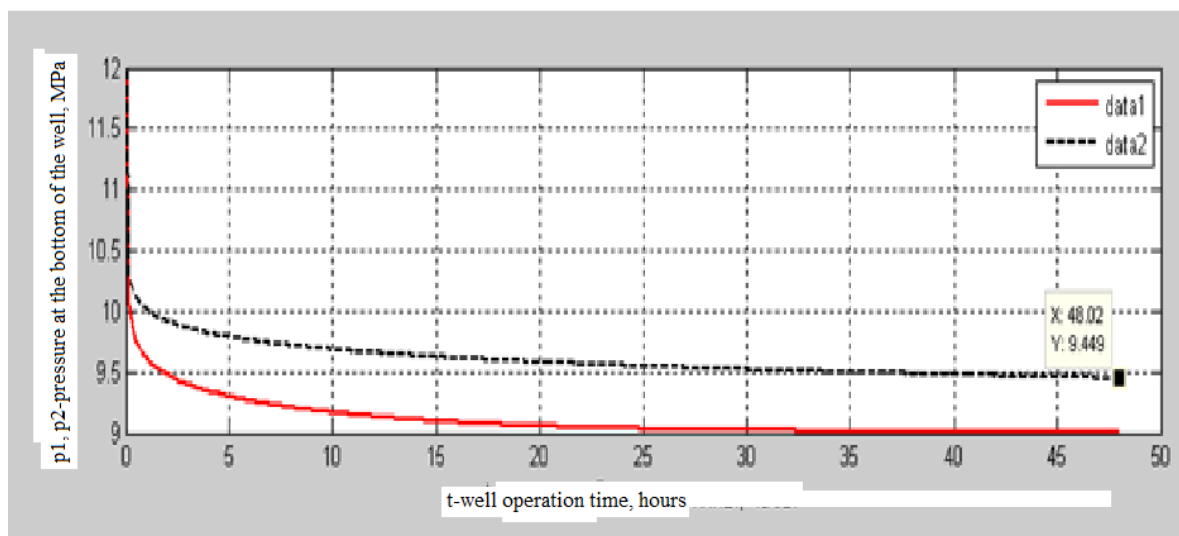


Fig. 2. - The dynamics of the pressure in the reservoir at the bottom of the well for 48 hours after the start of well’s operation, found by solving the problem numerically (data1) and by the formula of E.B. Chekalyuk (data2)

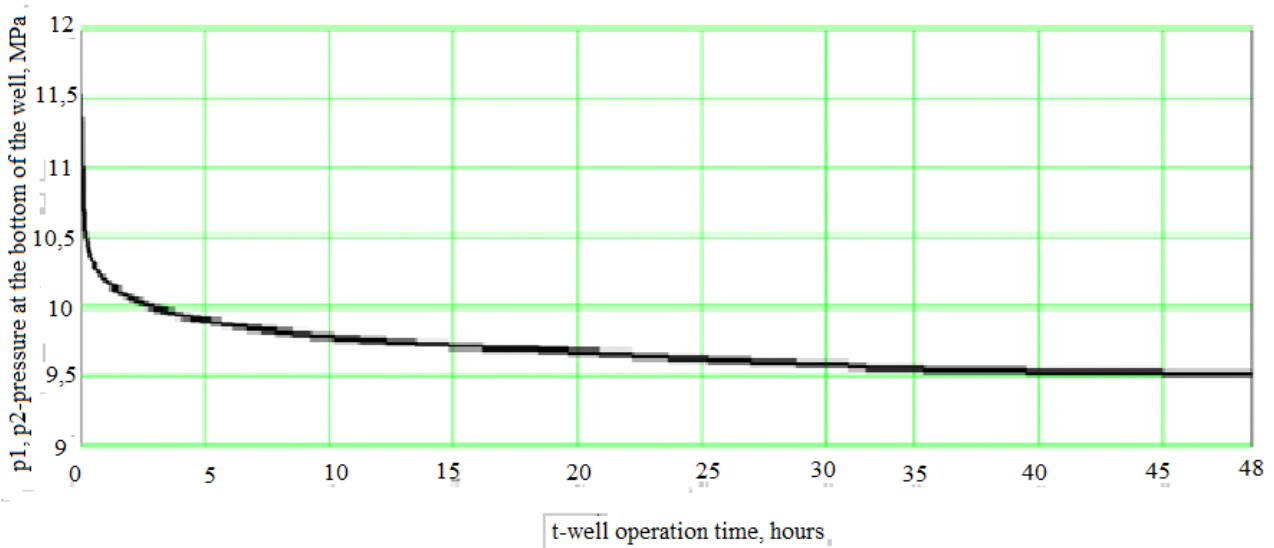


Fig. 3. - The dynamics of the pressure in the reservoir at the bottom of the well for 48 hours after the start of well’s operation received by ”PLAST_3D” program.

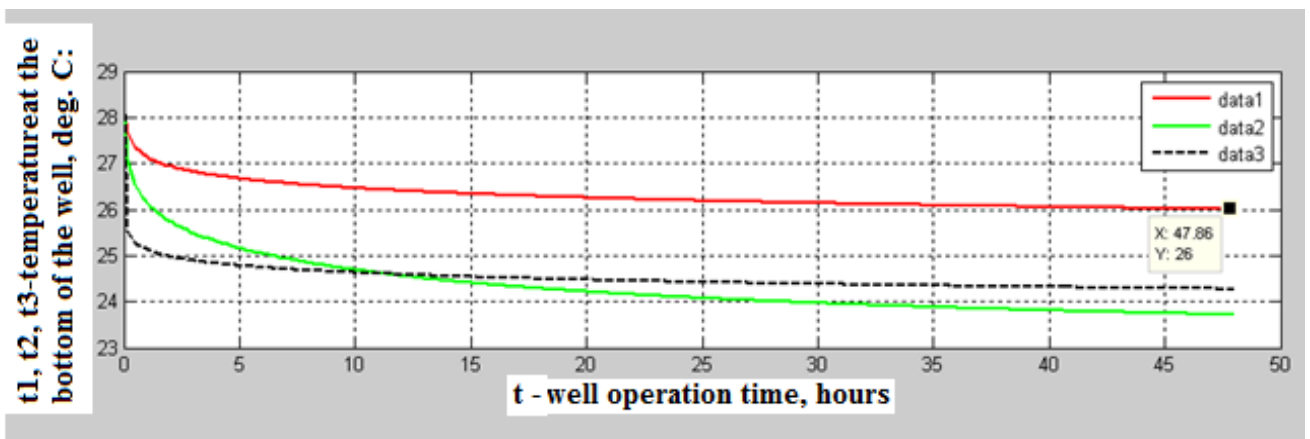


Fig. 4. - Dynamics of reservoir temperature on the bottom of the well for 48 hours of its operation, obtained by solving the problem in various ways: data1 - Graphics function (, t), (a numerical method for solving the problem); data2 - chart of the function (, t), (formula of E.B.Chekalyuk); data3 - graph of the function (, t), (traditional engineering formula)

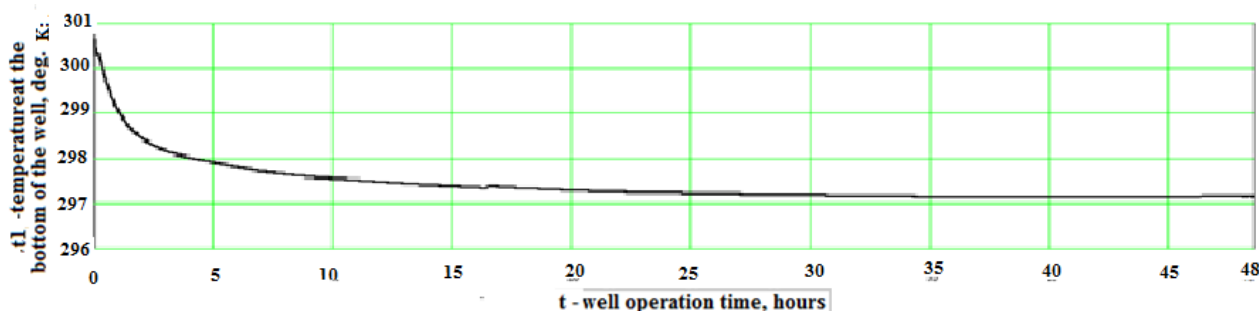


Fig. 5. - Dynamics of reservoir temperature on the bottom of the well for 48 hours of its operation resulting by “PLAST_3D” program.

From the charts presented in the thesis, the best match with the charts based on data obtained by “PLAST_3D” program for pressure and temperature at the bottom of the well holds for graphs constructed by the formulas of E.B. Chekalyuk. It's not a bad match, as can be seen from the numerical results presented in Tables 1 and 2:

Table. 1

Computation method	Ps MPa after 5 hours	Ps MPa after 24 hours	Ps MPa after 48 hours
Using the formulas of E.B. Chekalyuk	9.789	9.542	9.449
Program_3D	9.8999	9.6322	9.5144

Table. 2.

Computation method	^{°K} T after 5 hours	^{°K} T after 24 hours	^{°K} T after 48 hours
Using the formulas of E.B. Chekalyuk	297.93	297.58	297.42
Program_3D	297.9005	297.2321	297.1551

II.2. Simulation of gas mixture flow into the formation with an impermeable barrier



What is the impact on the gas flow of impermeable barrier located near the well? This question has been studied in the second computational experiment. As obstacles, we used a few elementary volumes with zero permeability completely filling a circular cylindrical sector in the vicinity of the well located at a distance $R = 6.5$ m. The sector permeates the reservoir over the entire thickness. In the reservoir feeding area is created the elementary finite-volume network. To do this, along the Or axis is still used irregular network of 70 points, and along the Oz axis – uniform network of 10 points. Furthermore, due to the three-dimensional problem by angle φ uniform network of 40 points is used. Calculations were performed starting with the mode of undisturbed reservoir at the same rate as in the first experiment. The well was run for 2 hours. What was the gas pressure distribution in the cross section of the reservoir is shown in Fig. 6. This cross section extends through the well axis and on the one side intersects the barrier. Where the cross-section passes through the barrier, the pressure is indicated by the same color as in the undisturbed reservoir. On the back of the barrier, the incoming flow of gas creates a high pressure zone. This is the left side of the figure. In the vicinity of the well, as expected, the pressure is minimal. The pressure gradient along the well is present, but it is not great. Therefore, it can be seen from the numerical results in Table. 3 and almost imperceptibly in Fig. 6.

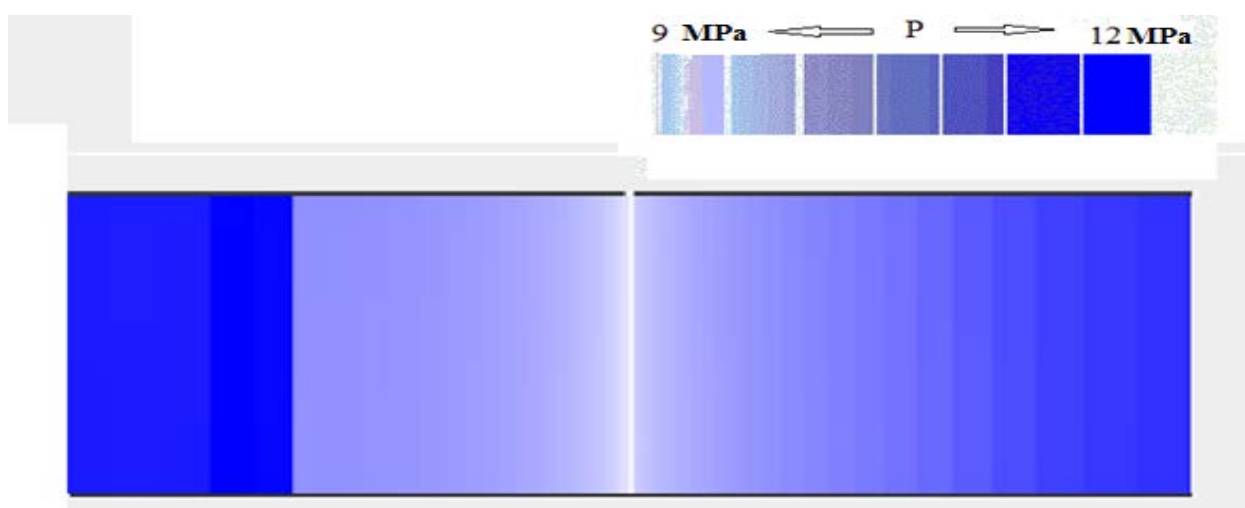


Fig. 6. Pressure distribution in the reservoir with barrier in vicinity of the well



Table 3

Pressure, temperature, speed of flow at the well sections

Q = 9.6877 kg/s with an obstacle in the reservoir after 2 hours of operation

Cross section of the well	Pressure Pa	Temperature°K	Speed m/sec
1	8.672806e+06	297.9403	0.2305122
2	8.671483e+06	297.9367	0.6919306
3	8.670128e+06	297.9270	1.154474
4	8.668739e+06	297.9123	1.618752
5	8.667317e+06	297.8914	2.085210
6	8.665861e+06	297.8628	2.554079
7	8.664370e+06	297.8245	3.025349
8	8.662845e+06	297.7735	3.498765
9	8.661284e+06	297.7093	3.973879
10	8.659687e+06	297.6373	4.450434
bottom of the well	8.658880e+06	297.6373	4.689074

Considered barrier has a significant resistance to the gas flow, and this leads to a decrease in pressure in the bottom of the well. After 2 hours of well's operation in the reservoir with the barrier pressure at the bottom is equal to 8.65888 MPa. This is significantly less than it was in the first experiment, when the reservoir had no barrier. Then, after 2 hours of operation, pressure in the bottom of the well was approximately 10 MPa (see. Fig. 3).

Fig. 7 shows the gas flow rate vectors at the center of all the elementary volumes in the vicinity of the barrier. The area shaded in gray drawing belongs to this barrier. Vectors in the immediate vicinity of the well are not shown here, because otherwise their greatness and density of the placement will close the entire figure.

In the third computing experiment, we consider the case when the well is drilled to the reservoir boundary and the gas flow passes through the inside of a cylindrical sector. Figure 8 shows the distribution of pressure in the reservoir on the flat section passing through the axis of the well. To the left of the well there is a section through a cylindrical sector, where the gas is flowing, and to the right, to a radius of 6.5 m, the area is too permeable, and further there is the area of impermeable rock. Dark blue color at this point corresponds to $P = 12$ MPa, i.e. the pressure in the undisturbed reservoir.

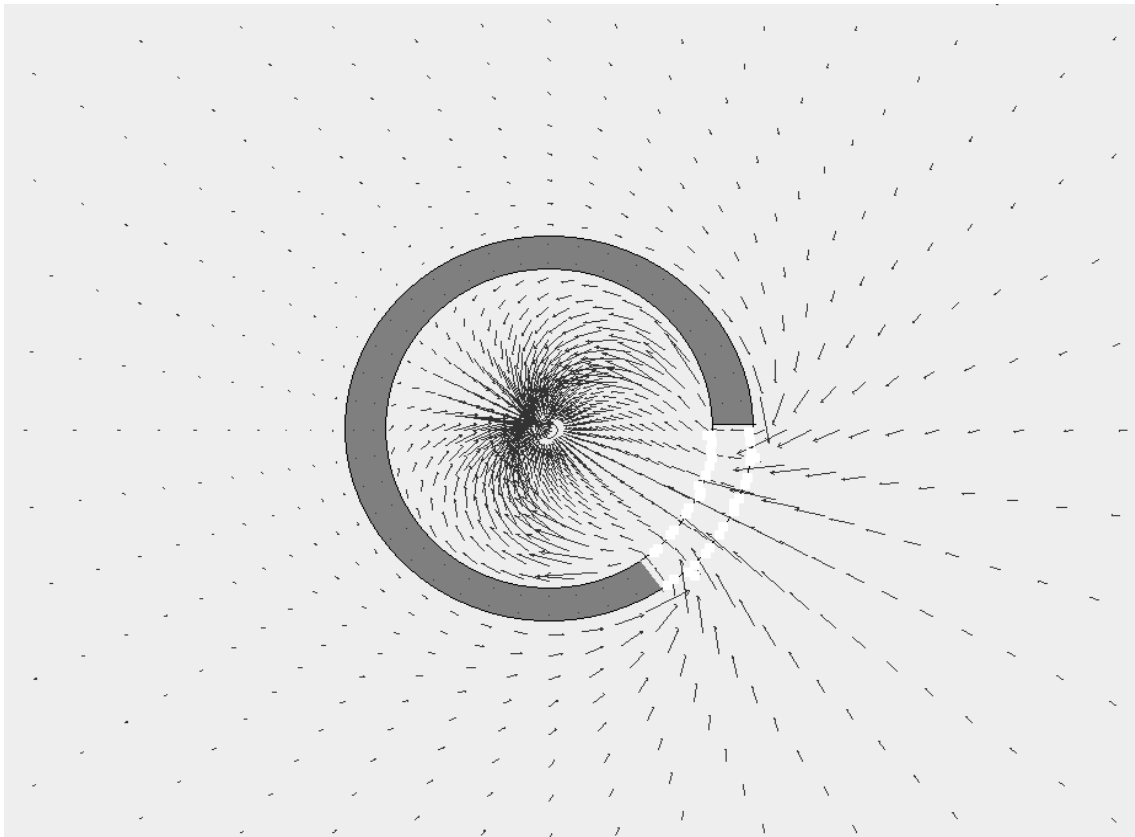


Fig. 7 The gas flow rates distribution near obstacles

II.3. Modeling of the gas mixture flow in the case where the well is drilled at the reservoir boundary

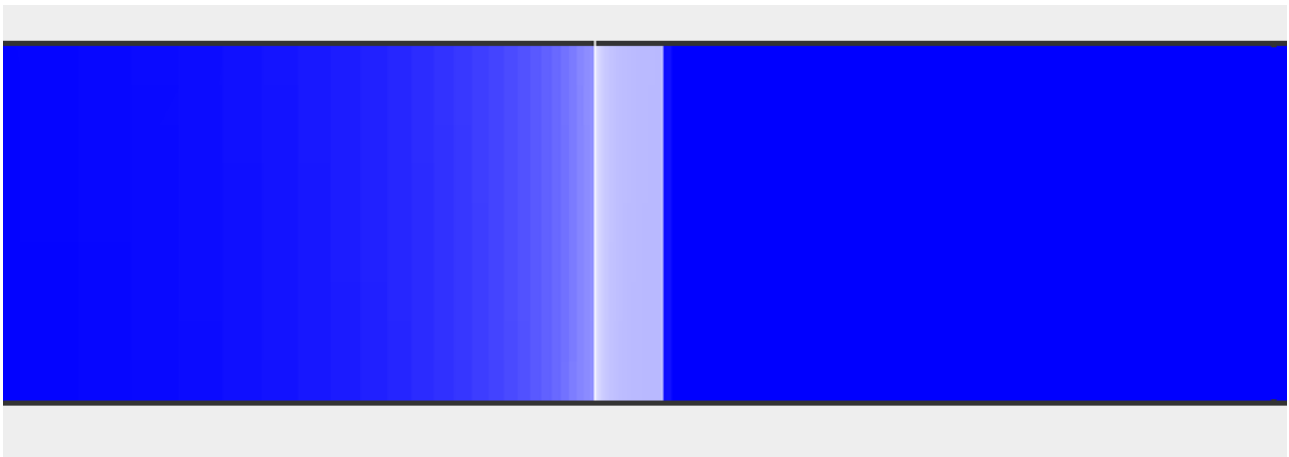


Fig. 8 The pressure distribution in the reservoir as a cylindrical sector in the vicinity of the well

Fig.9 has gray colored region of impermeable rock, in the vicinity of the well are shown the vector of speeds of gas stream. In the cylindrical sector gas flow coincide with the direction of dashed lines. Figure 9 shows only a part of the zone where the



computation is carried out. In reality, the computation was carried out to a radius of 500m. When the gas flows through a cylindrical sector, the flow resistance is even bigger than in the second experiment, when the flow enters into the well from all directions, and in its vicinity meets the barrier. This can be seen by comparing the data presented in Tables 3 and 4.

Table 4

Pressure, temperature, rate of flow at the well sections

with consumption $Q = 9.6877$ kg/s in the case where there is a cylindrical sector in the reservoir after 2 hours of operation

Cross section of the well	Pressure Pa	Temperature ^o K	Speed m/sec
1	7.757883e+06	297.7340	0.2659571
2	7.756704e+06	297.7346	0.7978000
3	7.755488e+06	297.7358	1.329496e
4	7.754233e+06	297.7367	1.861069
5	7.752941e+06	297.7375	2.392583
6	7.751610e+06	297.7381	2.924097
7	7.750242e+06	297.7386	3.455664
8	7.748836e+06	297.7389	3.987330
9	7.747392e+06	297.7392	4.519139
10	7.745910e+06	297.7393	5.050991
bottom of the well	7.745160e+06	297.7393	5.316899

Summary and Conclusions

The first test results of the proposed computer model, including those presented in this article, hold out a hope that it adequately simulates the actual filtration flow in the gas-bearing reservoirs and wells. The program allows simulating a wide range of modes of operation of the well, to take into account a variety of non-uniformity in the reservoir and to play a variety of boundary conditions, including at the bottom and top of the reservoir. There are more reserves to increase computing speed in the program. The proposed computer model can be used for comparing its results with those obtained using other techniques. Computational technologies used in this program can be used in the simulation of other physical processes, such as the simulation of gas flows in fuel elements and collectors of nuclear and thermal reactors.

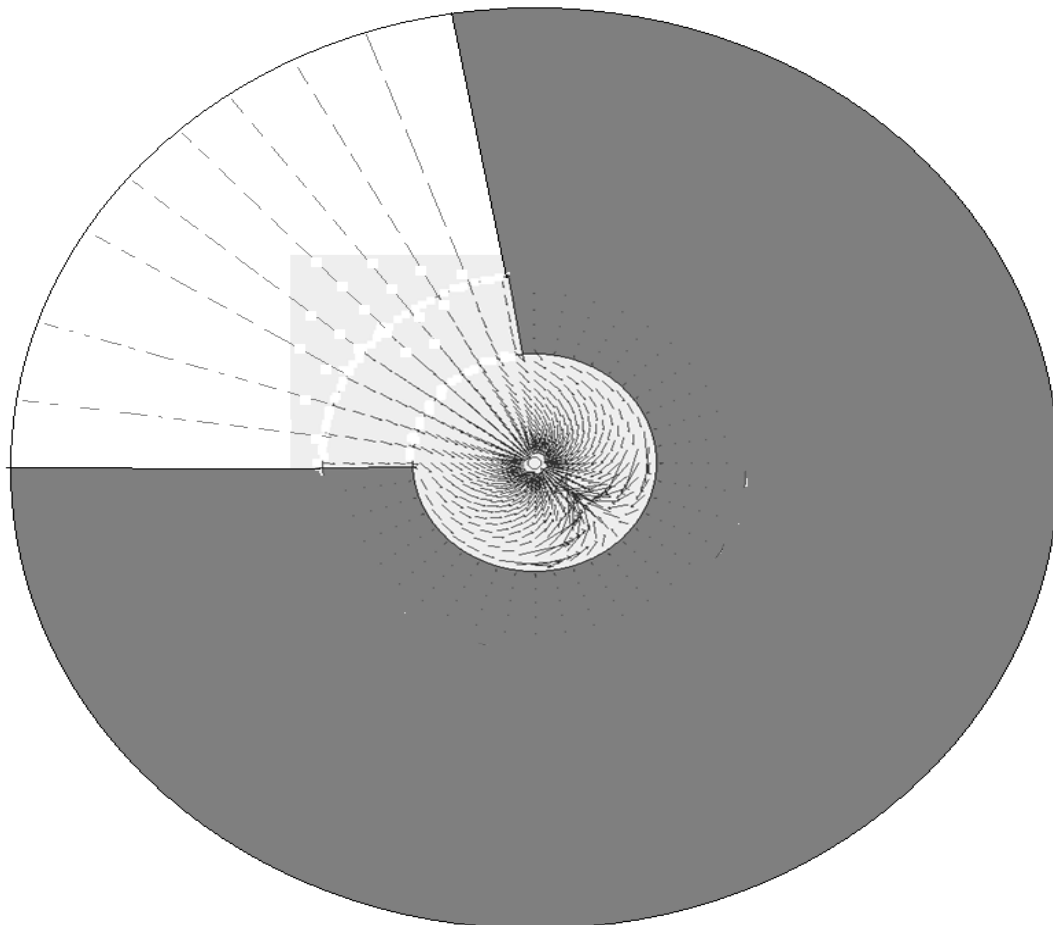


Fig. 9 Gas flow rate distribution in the reservoir of a cylindrical sector

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Аннотация.

В первой главе по аналогии с методом «потоков» для каждого элементарного объёма в пласте составлены интегральные уравнения в 3-мерном пространстве, следующие из законов сохранения массы, импульса и полной внутренней энергии газовой смеси. Исходя из полученных уравнений, по методу прямоугольников получена система консервативных конечно-разностных уравнений с явной схемой по времени в пласте. Течение в скважине предполагается одномерным и квазистационарным, и при составлении конечно-разностных уравнений балансов импульсов учитываются не только силы сопротивления потоку в скважине, но и конвективные силы. Помимо этих уравнений в скважине составляются конечно-разностные уравнения сохранения массы и уравнения, реализующие правило «смеси» для потока тепла через границу, моделирующие режим адиабатического расширения. На основе полученных уравнений составлен алгоритм совместного решения 3-мерной задачи течения смеси природных газов в пласте и одномерного течения в скважине. 2-я глава посвящена численным экспериментам, позволяющим оценить достоверность получаемых результатов. Для чего данные, полученные с помощью программы "PLAST_3D", сравниваются с данными, полученными другими авторами. Кроме того, во 2-ой главе представлены результаты, полученные с помощью программы "PLAST_3D", где решаются задачи, в которых течение газа является существенно 3-мерным. Эти результаты позволяют надеяться, что с помощью предлагаемой программы "PLAST_3D" и тем более, обладая современными суперкомпьютерами, возможно численно моделировать фильтрацию газов в реальных месторождениях с одной скважиной. Предлагаемые алгоритмы делают возможным дальнейшее усовершенствование программы, что позволит, например, учесть режим конденсации газов или моделировать месторождения из нескольких скважин (возможно и наклонных).

Ключевые слова: газонесущий пласт, метод потоков, вычислительная модель, численный эксперимент.

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Article sent: 15/03/2017 of

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j12-028

DOI: 10.21893/2227-6920.2017-12.028

УДК 622.24.058

**METHODS IMPROVE THE RELIABILITY
AND TIGHTNESS OF THE CASING
МЕТОДИ ПІДВИЩЕННЯ НАДІЙНОСТІ ТА ГЕРМЕТИЧНОСТІ
ОБСАДНИХ КОЛОН**

Vasylyshyn Vitalii/ Василюшин В.Я.

ORCID ID: 0000-0002-0367-1198

*Ph.D., Associate Professor of Engineering and Computer Graphics**Ivano-Frankivsk National Technical University**oil and gas, Ukraine, Ivano-Frankivsk, Karpatska 15, 76000**Кандидат технічних наук, доцент**доцент кафедри інженерної та комп'ютерної графіки**Івано-Франківський національний технічний університет нафти і газу**Україна, Івано-Франківськ, Карпатська 15, 76019*

Abstract: *The important direction of improving the reliability and safety of the construction and operation of the well is to improve the design and technology of the casing joint.*

Keywords: *casing string, reliability, integrity, screw connections.*

Complications and accidents during construction and operation of casing oil or gas wells are caused by the complexity of mining and technical conditions of work. The main causes abnormal function of the column: separation joints and pipes, pipe sections fall into the hole, complications of cementing and casing operation caused between the column and for the column manifestations and emissions. Due to abnormal function of threaded connections is 90% of all accidents casing, 40% due to loss of strength or break pipe thread in the thread and 50% - through leaks in joints.

Damage casing 5-7% of all accidents and their elimination spent 10-12% of emergency repair time, the share of these costs increase with depth drilling. Up to 70% of all complications caused by casing leakage of threaded connections. An important way to increase the reliability and safety of the construction and operation of the well is to improve the design and technology of casing joints. Disability casing due to loss of reliability required strength and tightness of socket joints threaded



connections. Even with full compliance of geometrical parameters of threaded connections standards such connections to a wide dispersion force interaction parameters that can not withstand operating pressures on the casing in the borehole.

The trend to hidden under-strength and tightness of threaded joints Casing joints in full compliance with their geometrical parameters of the standard, as the latter does not regulate the requirements screwing with specified torque. The requirement to end couplings coincide with the end of the thread pipe is unreliable criterion of efficiency connection. Therefore it is necessary to look for new technical solutions to improve reliability and ensure the strength and tightness of connections, increase efficiency socket joints compounds casing design and technological methods. The most important task to ensure the reliability casing joints are: the right choice of sealing greases or special sealants, oil-choice solutions and cementing process, create the necessary elastic tension in threaded joints. High efficiency and performance at the highest technical fastening and operation of wells in difficult geological conditions and obliquely-directed and horizontal wells showed highly airtight fittings node seal metal-metal, but they have some operational weaknesses. Therefore, increasing the strength and tightness of casing from improving connections with integrated hub seal is relevant and promising task. In the world of industrial practice showed highly airtight fittings have been widely used, for example, in Russia formed a separate class of "Premium" pipe connections with metal seals. The design showed highly airtight connections include conical trapezoidal thread profile seal metal-metal and persistent end. High thread type and OTTM common type in the world Buttress (according to the standards of the American Petroleum Institute API 5CT and API 5B) face significantly higher axial and bending loads than triangular thread. However, these structurally thread sealing functions do not perform. Sealing compounds is indicated with built-compaction. The principle of his work lies in the fact that when screwing thread outer surface of the pipe nipple is radial tension in the inner surface of the clutch and the area of contact occurring strain compression. Sealing the surface can be formed: Internal - cone, cylinder; outside - cone or convex surface (sphere, barrel). In OTTH coupling cone-cone seal with the company Hydril (USA): CTS, CTS-4,



RB, FJ, Super FJ, FJ-40, EU, Tripleseal; company Societe Valures (France): VAM, VAM AF, VAM AT-AF, Nev VAM; firm Nippon Steel (Japan): NS-CC and others. Convex shape nipple with sealing Extreme Line, Tenaris Blue, Antares MS, BDS, NK-3SB more. In seals KS Bear, FOX in conjugation are convex and concave surfaces. In the seal of the company Atlas Bredford (USA) TS-4S, Jj-4S, FL-4S, Jj-3SS are teflon ring. Increase moment screwing reach contact stresses on thrust plane or in the form of reverse cone ends, the main function of which is to limit the screwing and achieve precise axial positioning surfaces and seal carving with desired tension. However, significant axial tension, which are designed connection "Premium" reduce face interaction or revealing butt. However, when inflating stress disorder possible mechanical seals in curved wells. Making connections with metal-to-metal seal is associated with a number of high technological conditions, complicated design, they require high precision cutting and sealing of mutual accommodation, threaded and thrust surfaces. This is necessary for their simultaneous coordinated interaction and achieve the specified tension in conjunction, as tensions in the thread and seal substantially affect each other. Such compounds are sensitive to failure to comply with torque, especially to their excess. It is worth noting that in the use of the oil fields for screwing key casing high work effort, plastic deformations occur groove thrust surfaces and the ends of these compounds that significantly reduces their tensile strength. It is in the field of plastic deformation in the first place is corrosion of metal in the presence of corrosive components in the borehole. In-directed angle and horizontal wells are most effective seal with the convex surface of the nipple. But this interface has less contact area, requires more radial tension and achieves high contact stresses. The rapid onset of plastic deformation, in addition to corrosion, leading to deviations form surfaces, reduce tension, tightness, declining terms of re-screwing. The authors of [1] proposed a device for sealing socket joints pipe connections established between the ends of the tubes and includes bushing, which is deformed in cold curved sections alternating along its length to form the surface of the second and fourth orders. It provides in connection deformation screwing each curved section and thus the distribution of



strain at full length sleeves, bushings increases strength and can provide tightness at higher internal pressures.

Shape sleeve ends and the ends of the pipes is chosen independently flat, conical, convex or concave. The conical shape of the end is different from a plane at an angle, the tangent of which does not exceed the value of the coefficient of friction between the sleeve and the pipe ends. Such performance contact sleeve ends and pipes allow forming most workable connection depending on the given conditions, sizes and materials of its connection details. Find ways to improve designs highly hermetic threaded joints to improve reliability casing is relevant and promising task.

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Анотація: Важливим напрямком підвищення надійності і безпеки будівництва та експлуатації свердловини є удосконалення конструкції і технології виготовлення з'єднань обсадних труб.

Ключові слова: обсадна колона, надійність, герметичність, різьбові з'єднання.

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Article sent: 29/03/2017 of
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j12-019

DOI: 10.21893/2227-6920.2017-12.019

**RESEARCHING EFFECT OF METAL AND NONMETAL OXIDES FOR
STRUCTURE AND PROPERTIES CERAMICS BASED ON SILICON
CARBIDE**

**ДОСЛІДЖЕННЯ ВПЛИВУ ОКСИДІВ МЕТАЛІВ ТА НЕМЕТАЛІВ НА
СТРУКТУРУ ТА ВЛАСТИВОСТІ КЕРАМІКИ НА ОСНОВІ КАРБІДУ
КРЕМНІЮ**

assistance lecturer Іванов А.А. / викладач-стажист Іванов О.О.

Ivano-Frankivsk National Technical University of Oil and Gas, Karpats'ka 15 str.

Івано-Франківський національний технічний університет нафти і газу, вул. Карпатська 15

Abstract. In this article was analyzed the impact of eutectic additives of metals and non-metals on the properties and structure of ceramics based on silicon carbide. Considered eutectic additives composition are MnO-TiO₂, CaO-B₂O₃- SiO₂. Was analyzed the influence of additives on physical parameters such as density, porosity and microhardness; the technological parameters - the melting point of ceramic additives. Researched the influence of additives in a weight percentage of 15% and 20%.

Key words: Eutectic, silicon carbide, constructional ceramics, carbon, microhardness, density, porosity, melting point

Introduction.

Nowadays for modern machinery is necessary to create a new material which have a new structure with a high quality.

Among these material can be identified carborundum. Ceramic based on carborundum has a great mechanical strength at a high temperature and wear resistant. On the one hand carborundum has a low coefficient of expansion on the other hand it has a chemical inertness, corrosion resistance and radiation impact [1].

Unfortunately to syntheses ceramic based on carborundum is difficult process which need to sintering without supplements at extremely low temperature about 2150-22200 C. As a result the ware have a sponginess because of SiC has a low



volatility and diffusivity [2]. It's a great disadvantages of this process. To solve this problem can be used an eutectic material system such as: MnO-TiO₂ and CaO-B₂O₃-SiO₂.

The main text

The source of material were used powder of carborundum with an average grain size 4-6 mkm, 3-4 mkm. The source of modifiers were used material system like this Al₂O₃ – ZnO₂; MnO-TiO₂, CaO-B₂O₃- SiO₂.

Furthermore on the surface of carborundum always is an oxide layer. This layer will have a positive impact with supplements for sintering. This process will lead to free regroup of grain carborundum during sintering. It makes possible to obtain the material with a low physical and technical characteristic.

The fusible eutectic mixture have the oxide boron, manganese, titanium. These supplements were lowering the surface tension of the melt. The melting point of this mixture is about 1300⁰C. As result the fine-grained and dense microstructure of ceramics. The table 1 shows the mixture of researching supplementens and melting temperature.

Table 1

Supplements (mas, %) temperature of melting (°C)

oxide supplements	CaO	B ₂ O ₃	MnO	TiO ₂	SiO ₂	Temperature of melting, °C
MnO – TiO ₂	-	-	35,0	65,0	-	1290
CaO – B ₂ O ₃ – SiO ₂	59,2	16,0	-	-	24,8	1118

The main properties of models materials synthesized at the 1900⁰C. Researching properties are sponginess, average density, tensile strength in compression and tension. The table 2 shows the results.

Summary and Conclusions.

As a result we can see that using fusible eutectic which have a boron oxide and titanium can't lead useful results.



Unfortunately, the current properties level of studied ceramics and especially their density is insufficient for wide industrial use. To realize the potential possibilities of this material, including oil and gas technology, there is necessary to create a high density ceramic materials and products from them. Further studies should be conducted sintering of silicon carbide with other metal oxides and non-metals oxides that will affect on the properties more positive.

Table 2

The properties of models materials.

Mixture of models	Researching		
	ρ , г/см ³	П, %	$\sigma_{ст}$, МПа
SiC + 15 мас.% MnO – TiO ₂	2,50	24	122
SiC + 20мас.% MnO – TiO ₂	2,60	28	140
SiC + 15 мас.% CaO – B ₂ O ₃ – SiO ₂	2,21	18	80
SiC + 15 мас.% CaO – B ₂ O ₃ – SiO ₂	2,50	19	160

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Анотація.

В цій роботі проведено аналіз впливу евтектичних добавок металів та неметалів на властивості та структуру кераміки на основі карбиду кремнію. Розглянуто добавки евтектичного складу MnO-TiO₂, CaO-B₂O₃- SiO₂. Проаналізовано вплив добавок на такі фізичні параметри як густина, пористість та мікротвердість; на технологічні параметри – температура плавлення кераміки з добавками. Розглянуто вплив добавок у масовому відсотку 15% та 20%..

Ключові слова: Евтектика, карбід кремнію, конструкційна кераміка, вуглець, мікротвердість, густина пористість, температура плавлення

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Article sent: 27/03/2017 of

© Ivanov Alexandr

**j12-048****DOI: 10.21893/2227-6920.2017-12.048****RECOMMENDATIONS AND LEGAL BASIS FOR THERAPEUTIC****NUTRITION****РЕКОМЕНДАЦИИ И ПРАВОВЫЕ ОСНОВЫ ЛЕЧЕБНОГО ПИТАНИЯ****s.t.s., as.prof. Kupchak D.V / к.т.н., доц. Купчак Д.В.****Lyubimova O.I / Любимова О.И.***Khabarovsk State University of Economics and Law, Khabarovsk, Serysheva, 60,**Хабаровский государственный университет экономики и права, Хабаровск, Серышева, 60*

Abstract. The article deals with the legal provision of therapeutic and prophylactic nutrition for patients of a medical hospital, the positions on the organization of therapeutic nutrition in treatment and prophylactic institutions are determined, and the tasks of therapeutic and preventive nutrition, incl. for oncological patients.

Key words: health food, organization of therapeutic nutrition, specialized food products, therapeutic diets

Introduction.

Curative food is a food that provides satisfaction of the physiological needs of the human body in nutrients and energy, taking into account the mechanisms of the development of the disease, the characteristics of the course of the underlying and concomitant diseases, as well as performing preventive and therapeutic purposes.

The process of organization of therapeutic nutrition in medical institutions of the Russian Federation should be considered from the position of the current federal legislation. For the first time in Russian legislation, Federal Law No. 323-FZ of 21.11.2011 "On the fundamentals of protecting the health of citizens in the Russian Federation" defines the rules governing the basis for the organization of therapeutic nutrition.

Norms of therapeutic nutrition - the basis for the formation of food rations and at the same time, the organization, planning and financing of the entire system of therapeutic nutrition in the institution.



The main text The organization of treatment and prophylactic nutrition of patients on inpatient treatment is carried out in all medical organizations that have 24-hour beds and a day-stay with meals in accordance with Order No. 330 of the Ministry of Health of the Russian Federation of August 5, 2003 "On Measures for the Improvement of Clinical Nutrition in Treatment and Prevention Institutions Russian Federation".

The documents that are approved by this order are strictly obligatory for application in the organization of nutrition, document circulation, accounting for the consumption of food products, the appointment of therapeutic nutrition to various categories of patients in accordance with the diseases and complications of diseases.

One of such documents is the instruction on the organization of therapeutic nutrition in medical and preventive institutions, which contains strictly defined positions on the organization of therapeutic nutrition: characteristic, chemical composition and energy value of standard diets used in health facilities (in hospitals, etc.); ratio of natural food and specialized foods in the daily diet of the patient; interchangeability of products in the preparation of dietary dishes; replacement of foods by protein and carbohydrates; order of discharge of food for patients in treatment and prophylactic institutions; the order of the control over the quality of ready-made food in a medical and preventive institution; recommendations for the equipment of the food unit and pantry; conditions for transportation of ready meals; sanitary-hygienic regime of the kitchen and pantry; a list of the nutrition unit documentation for the discharge of food and control over the quality of the finished food in the treatment and prophylactic establishments.

Therapeutic and prophylactic nutrition of patients in cancer centers is carried out through three directions in the diet.

Standard diets are diets with a physiological content of proteins, fats and carbohydrates and enriched with vitamin and mineral complexes. Special diets are assigned to a specific clinical and statistical group of patients whose condition requires the exclusion of certain foods from the diet. Individual diets are assigned to a particular patient whose condition requires the elimination of certain foods from the



diet. If he has a decrease in body mass index below the normative indices, then the diet is formed individually in accordance with the nosological form of the disease, the phase of the disease, the need for additional nutrition.

At the same time in the organization of therapeutic nutrition in the oncology center, in addition to dietary, enteral and parenteral nutrition is used, which differ from each other by the presence of medical indications for use, organizational technologies, the organization of the production process and the technique of implementation.

Dietary meals are organized and conducted by a dietitian. The technology of implementation is associated with the appointment of a certain diet to the patient in accordance with the approved list of diets. As the specialized products of therapeutic nutrition in the diet of cancer patients, mixtures containing the main macro- and micronutrients in optimal proportions or in the amount necessary to correct the main components of the food are used.

At present, most of the medical institutions of the Russian Federation have introduced the technology of protein correction of medicinal rations in order to increase the nutritional and biological value of diets. The selected products must comply with the requirements of GOST R 53861-2010, and there must be appropriate documents on certification and quality.

A separate issue in the organization of therapeutic nutrition is the presence in the hospital of specialized products of therapeutic nutrition, intended for nutrition of cancer patients with hereditary metabolic disorders (for example, in phenylketonuria or lactase deficiency). In the composition of such products, either the amount of substances intolerable to the body is limited, or they are generally not there. Thus, phenylketonuria completely excludes the amino acid phenylalanine, which is perceived by the body as a poison because of a defect in the enzyme system. That is why for people suffering from phenylketonuria, galactosemia, celiac disease, there are specialized products of therapeutic nutrition.

Malignant neoplasms are an important medical and social problem of modern society. According to the World Health Organization, more than 7.5 million people



die of cancer each year, which is 13% of all deaths from all causes.

All oncologists agree that nutrition plays an important role in the development of cancer. Food can both reduce the risk of tumor formation and affect its development. The importance of proper nutrition in cancer is so great that it is often this moment that becomes the decisive factor of recovery.

The following items are among the tasks that the therapeutic diet should solve in cancer diseases: food should stimulate the immune system and metabolism; inhibit tumor development; help cleanse the body; regulate the composition of blood; give the body additional strength and energy.

Providing a generally restorative physiological effect, improving well-being and supporting the necessary physiological functions of the body, properly organized nutrition improves the quality of life of patients. It is established that patients who adhere to the recommended diet, better tolerate the operation and the postoperative period. Compliance with a special diet can improve the general condition, reduce the likelihood or eliminate the development of side effects; Reduce toxicity and successfully deal with side effects of radiation and chemotherapy, so that patients are able to withstand large doses of a particular treatment. In addition, diet therapy helps to more quickly eliminate the consequences of chemotherapy and restore impaired functions. Proper, balanced nutrition helps maintain weight, prevents metabolic disturbances and promotes the restoration of normal tissues. Oncological patients who adhere to scientifically based rational nutrition are less prone to infectious and inflammatory processes and the risk of depletion.

Summary and Conclusions.

The use of specialized food products opens up great opportunities for the organization of therapeutic and preventive nutrition. With the help of rationally constructed diets, the general stability of the organism is improved, the use of the properties of food components, their protective effect on the structure and function of the most affected organs, compensation of excessively consumed food and biologically active substances in connection with diseases.



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Аннотация.

Введение. Приводится краткая характеристика лечебно-профилактического питания в условиях стационара для больных.

Основная часть. Приводится правовое обеспечение лечебно-профилактического питания пациентов медицинского стационара, определены позиции по организации лечебного питания в лечебно-профилактических учреждениях, обоснованы задачи лечебно-профилактического питания, в т.ч. для онкологических пациентов.

Выводы. Значение лечебно-профилактического питания для пациентов лечебных учреждений

Ключевые слова: лечебное питание, организация лечебного питания, специализированные продукты питания, лечебные диеты

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Article sent: 01/04/2017 of

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j12-054

DOI: 10.21893/2227-6920.2017-12.054

STRUCTURAL ANALYSIS OF CONDUCTED WORKS IN CALORIMETRIC STUDIES

СТРУКТУРНЫЙ АНАЛИЗ ПРОВОДИМЫХ РАБОТ ПРИ КАЛОРИМЕТРИЧЕСКИХ ИССЛЕДОВАНИЯХ

s.t.s., as. prof. Vasilenkov V.E. / к.т.н., доц. Василенков В.Е.

applicant, head of labor. Gudzenko M.N. / соискатель, зав. лаборатор. Гудзенко М.Н.

National university of life and environmental sciences of Ukraine, Kyiv,

Heroyiv Oborony, 15, 03041

Національний університет біоресурсов и природопользования України, Київ,

ул. Героев Обороны 15, 03041

Abstract. In this paper we describe the structure of the main work performed during the calorimetric studies with solid fuel. A technical analysis of the properties of solid biofuels using a calorimetric bomb has been developed.

Key words: structural analysis, calorific property, bomb calorimeter, solid biofuels

Introduction.

Determining the composition, properties and evaluation of product quality of any industry performed using technical analysis. But not only the industry but the agricultural sector today actually turns on the production of biofuels (solid, liquid and gas) with significant potential in the future for which also need to conduct technical analysis. One of the important tasks of this analysis is to determine the calorific properties of biofuels, in this case solid [1, 2].

The vast majority of researchers and practitioners nowadays determine the calorific properties of solid biofuels and solid fuels in general theoretical way according to its elemental composition. It uses a formula D. Mendeleev [1]

$$Q_n^p = 81C^p + 300H - 26(O^p - S_n^p) - 6(9H^p + W^p), \text{ kcal / kg} \quad (1)$$

where C^p , H^p , S_n^p , W^p – under the weight of carbon, hydrogen, oxygen, sulfur and fuel moisture in the working mass of fuel, %.



But, as the author notes, this formula can be used only for approximate calculations. In the states of Western Europe, USA, Japan granulated biofuel is increasingly used in industrial power, and in domestic heating systems. Dozens of companies offer heating equipment that uses pellets as fuel. Most used pellets of wood waste, straw, sunflower husk. In Ukraine, the number of enterprises with the introduction of alternative technologies for thermal energy by replacing fossil fuels with fuel of biological origin grows increasingly with the growing energy crisis in the country.

Made of monitoring the use of calorimetric bombs to determine calorific fuel properties showed that its use is very limited. This is due to the following reasons: there was loss transfer practical skills at these facilities, that lost technology experimentation; production calorimeter bombs remained in Russia and its cost varies between 400-1500 thousand UAH. In addition to Russia, producing bomb calorimeter engaged in Germany and China.

The aim of research was to develop a phased Detection Technology calorific properties of solid biofuels.

The department heating National Agriculture University of Ukraine developed the bomb calorimeter and experimental studies to determine calorific properties of solid biofuels (briquetted, granulated), which allowed to gain practical experience in this bomb and develop a phased Detection Technology calorific properties of solid biofuels. Research carried out in the following stages.

The first stage involved the description of the structure of an experimental laboratory setup (calorimetric bomb). The second stage. Preparation of sample and bombs before the experiment. Preparation of sample consumption. Solid biofuels crushed into powder. Before this crucible is weighed, and then - a sample of fuel (0,9-1,5h) with pot. To get the exact weight of primer, weighed on an analytical balance 10-15 fuses together and calculated the average weight of one sunk.

Preparation calorimetric bomb. Making sure that the cover glass bomb and have the same number that is complete, graduated cylinder or pipette gained 1.0 mg distilled water without splashing poured it on the bottom of the bomb. Fuel sample



was placed in a crucible, and the ends attached to the contact sunk performances. The connection must be reliable and enthusiasm must not touch the crucible. The combustion of the sample in powder primer attached to the end of the contact, and an elongated middle part insert in powder consumption. The pressure in the bomb brought to 24-30, atm.

The third stage. Preparation calorimetric installation. Remove calorimetric jar and fill it referred to the number of installations of distilled water. Beware of the ends of the contacts bomb removed from the stand and installed it in the water at the centre of the calorimetric vessel. The water level should reach the middle of nuts branching valves. Ignition wires attached to the contacts bomb casing and the lid closed. Included in the network installation.

Fourth stage. Carrying out the experiment. Prepared to record readings during the experiment Table 1. The experiment was carried out in three stages:

start - before burning sample and is used to heat calorimetric accounting system with the environment in terms of the initial test temperature;

head - for which there is combustion and heat transfer batch calorimeter system;

end - defined installation heat to the environment in terms of the final test temperature (see Table 1). Fifth stage. Dismantling installation.

Table 1

Form for recording output parameters

The initial period		The main period		The final period	
№	Temperature	№	Temperature	№	Temperature
1		1		1	
2		2		2	
...		
11		11		11	

By author

Summary and Conclusions.

On the basis of literary and patent searches and results of experimental



researches the technical analysis of the properties of solid biofuels using calorimetric bomb, which will help to further build the laboratory technical analysis in the production of solid biofuels, as well as changing the composition of the fuel, to determine the best option calorific value and compare it from fossil fuels.

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Аннотация.

В работе приведена структура основных выполняемых работ при проведении calorиметрических исследований с твердым топливом. Разработан технический анализ свойств твердого биотоплива с использованием calorиметрической бомбы.

Ключевые слова: структура, calorиметрическая бомба, твердое биотопливо.

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Article sent: 04/04/2017 of

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j12-056

DOI: 10.21893/2227-6920.2017-12.056

IMPROVING TWIN-SCREW EXTRUDER FOR EXTRACTION**VEGETABLE OIL****ВДОСКОНАЛЕННЯ ДВОГВИНТОВОГО ПРЕС-ЕКСТРУДЕРА ДЛЯ****ВІДТИСКАННЯ ОЛІЇ****applicant, head of labor. Gudzenko M.N. / пошукач, зав. лаборатор. Гудзенко М.М.****s.t.s., as. prof. Vasilenkov V.E. / к.т.н., доц. Василенков В.Є.***National university of life and environmental sciences of Ukraine, Kyiv,**Heroyiv Oborony, 15, 03041**Національний університет біоресурсів і природокористування України, Київ,**вул. Героїв Оборони 15, 03041*

Abstract. In this paper we discuss the features of a working parts of twin-screw extruder for extracting vegetable oil and analyzed the impact of their geometrical parameters for quality performance of the extruder. Based on the analysis of scientific literature authors developed prototypes of improved working bodies (cylindrical-cone nozzles) twin-screw extruder and received a patent for the invention.

Key words: twin-screw extruder, vegetable oil, patent, working parts, screw.

Introduction.

Production of oil is mainly carried out by mechanical pressing and used as a means of screw presses of various designs. They belong to a group of machines continuous main working body which is oil outlet chamber contained therein other (single screw press) or more (preferably twin-screw extruder) screw shafts. A classic principle of compression screw presses are of oil material along the screw shaft in the direction of raw materials, which is carried out by reducing the free volume of the working area in the coils of the screw shaft and the gradual reduction of the gap between the step and the inner surface of the cylinder turns and oil outlet chamber.

In the chamber extruding mechanism oil presses in addition to conventional working bodies, such as screw and oil outlet chamber also used crushing attachment and throttling means. The latter include: compression valves, intermediate matrix ring



performances throttling washers [1]. Thus, process intensification extraction oil in oil press can be achieved in many ways, but the process of improving quality characteristics of screw presses happens all the time and remains relevant.

Dialing working bodies of the screw shaft allows to select profiles of working with standard components, which completed extruder (conveying, mixing, squeezing, dispersants, et al.). Geometry composite worms provided a set of core elements cams equipped with curved surface (often in the form of curved triangle, which increases the amount of space between screw turns) installed on the working shafts with angular displacement relative to the other and create shear stress, which 3-5 times the stress of shipping turns. The numerical values of geometrical parameters, change them significantly affect the characteristics of the processes occurring in the press extruder, performance percentage oil yield, quality, reliability and durability of the costs and power density media [1].

In the 80-90s of the last century trend of a fundamentally new design solutions gave way to improving the design of screw shafts, cylinders of material and automatic control and regulation. Improving the quality extraction oil in a press extruder unlike classical oil presses achieved by replacing traditional coils (screw attachment) with two structurally-technological areas (power compression) screw shaft with four main areas: power, compression, mixing and milling, the final extraction. As a result, twin-screw extruders are more longer screw shaft, due to the introduction to the special design of mixing elements.

The main text. Twin-screw extruders principal difference from single-rotor, is that screw channels spiral nozzles are virtually isolated number C-shaped volumes. The material, which was in this volume is transported during rotation of the shaft toward the matrix and one turn squeezed two C-shaped volumes almost regardless of the resistance in the cone of the matrix. This extruder performance does not depend on this support, and cutting depth can be relatively large, which reduces the strain rate and therefore the intensity of dissipation, and thus increases the proportion of heat that rises from the wall heating bodies. Full C-shaped extrusion volume ensures equality residence time of material in screw attachments channels, which is especially



important that the material does not overheat. Seals twin-screw extruder in the mass performed by reducing the volume of closed C-section [3]. This reduction is carried monotonic increase in the width of the coil, reducing degreeal cutting step. It should be noted that the presence of gaps between the screw cap and between the turns and the housing leads to poor performance, on the other hand promotes better mixing of the masses.

Press extruder, which is used for constructive extraction oil are performed simultaneously placed screw shafts that rotate in one direction, while are in mutual engagement that enables the development of high blood pressure on a relatively short section. The rotation of the screw shaft in one direction can increase the frequency of their rotation without the possibility of jamming, and therefore increase productivity for high-quality mixing of components. The geometric profile of turns selected so that the coils are mutually purify one another over the entire surface and overlying winding channels in the areas of engagement for more than 50% of the area with a continuous 8-shaped channel. The main advantage of such a press extruder is that the system of their job by choosing variable elements can provide the required working channel geometry and thus the corresponding shear stress at different sites along the length of the extruder. So by combining variable elements in the media can affect the quality indices extraction oil. The disadvantage of the majority of screw presses is the low yield of oil due to the fact that a significant barrier materials meet the press before leaving the matrix in the area, due to lack intensity spin spiral nozzles along the entire working length of the screw shaft.

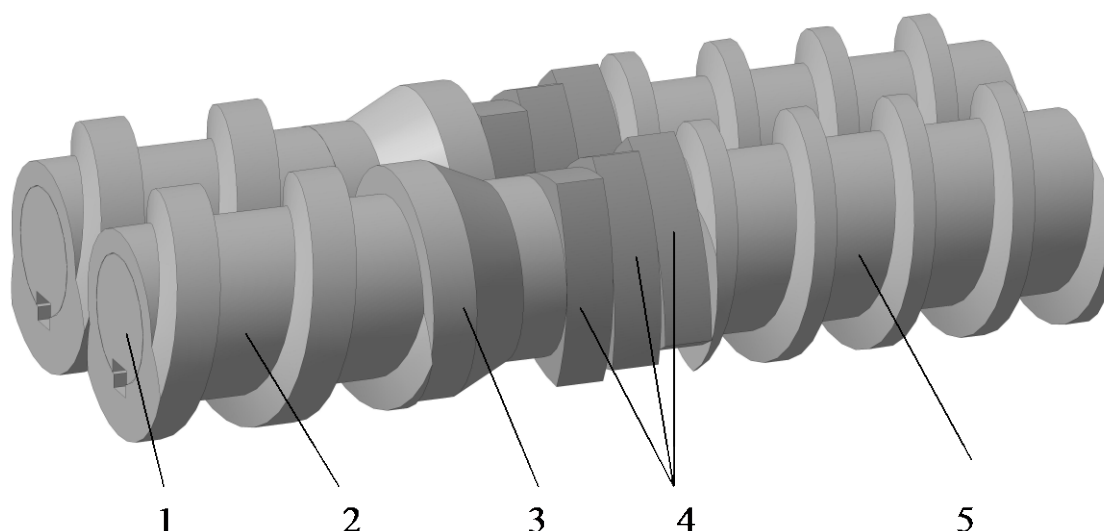
Based on the analysis of scientific literature authors developed and manufactured prototypes of improved working bodies (cylindrical-cone nozzles) Twin-screw extruder press. As a result of the work received a patent [4].

The formulation tasked with improving Twin-screw extruder press, which by introducing new elements and their relationships with prominent provided additional interim oil lockup for raw materials and intensifying destruction while stirring the processed material, which increases the overall quantitative measure of oil extraction and the possibility of their implementation provided as single and multi-directional



rotation of the screw shaft.

Advanced Twin-screw extruder press [4] has a working chamber formed of series-connected, boot sections, sections of buildings impermeable walls, external electrically heated elements, oil outlet chamber sections and matrix. In the chamber parallel two shafts of planting them, alternately mutually connected by spiral nozzles and groups triangular cam nozzles along the length camera and front groups triangular cam nozzle from side loading of the neck to the shaft installed crushing cylinder-cone nozzles (Fig. 1).



By author

Fig. 1. Fragment working bodies twin-screw extruder press:

1 - shaft; 2, 5 - screw turns; 3 - cylindrical-cone nozzle; 4 - cam triangular nozzle.

Each cylinder-crushing cone nozzle is designed as parts consisting of two cylindrical and truncated conical surfaces between them. The length of the truncated cone shape nozzle is greater than the length of the cylindrical surfaces of the nozzle. Cylindrical-cone nozzles are installed in the same plane on different shafts towards each other.

Summary and Conclusions.

Having improved the working of a twin-screw press-extruder for extraction oil provides additional lockup oil raw materials at the beginning of its movement along the press and the intensification of destruction while stirring the processed material



resulting in increased quantitative measure ousted the oil already in the first oil outlet chamber, which increases the total amount of ousted oil. Also offered cylindrical-conical nozzle design is quite simple and does not require significant costs in manufacturing.

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Анотація.

В статті розглянуто особливості конструювання робочих органів в двогвинтових екструдерах для відтискання олії та проаналізовано вплив їх геометричних параметрів на якісні показники роботи екструдера. На основі проведеного аналізу науково-технічної літератури розроблено дослідні зразки вдосконалених робочих органів (циліндрично-конусні насадки) двогвинтового прес-екструдера та отримано патент на винахід.

Ключові слова: двогвинтовий екструдер, олія, патент, робочі органи, гвинтовий вал.

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Article sent: 03/04/2017 of

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**j12-069****DOI: 10.21893/2227-6920.2017-12.069****УДК 637.352****РАЗРАБОТКА ТЕХНОЛОГИИ НОВОГО МЯГКОГО КОЗЬЕГО СЫРА****UDK 637.352****DEVELOPMENT OF TECHNOLOGY A NEW KIND OF SOFT GOAT
CHEESE****Ryzhkova T.N., Stefan V.P.Nedilko J.O./ Рыжкова Т.Н., Штефан В.П., Недилько Ю.О.***Kharkiv State Academy of veterinarian**62341, Kharkov region, Dergachi district, p. Danilovka in Mala*

Annotation. The article presents the results of research aimed at studying the influence of aromatic herbs - to improve the quality of turmeric myagkogoo goat cheese thermoacid mode of production.

Keywords: soft goat cheese, spicy, aromatic herb - turmeric, smoking, quality, shelf life.

Introduction.

In recent years, increased demand for products of high nutritional and biological value. That meets the requirements of goat's milk and dairy products based on it.

Research Methods.

Determination of physical and chemical composition was performed instrumental (on the device) in the test center of the Institute of Livestock NAAS of Ukraine, accredited according to the requirements of ISO / IEC 1725: 2006 (ISO IEC 725: 2005 (accreditation number T621 in the National Accreditation Agency of Ukraine).

The purpose of research. Scientific substantiation of ways of improving the quality of goat's soft cheese "Adyghe" type and increase its shelf life.

Literature review. The increase in production of goat's and sheep's milk inhibits the existing problem: the presence in it, respectively, " goats' 'and' 'lamb' flavor [1].

It should be noted that the presence of off-flavor and odor suint goats in dairy



products, particularly cheese, the majority of consumers in the Ukraine, is perceived as a drawback. Due to a lack in goat milk carotene - provitamin A, which the body goats, unlike cattle organism, able to transform into a healing vitamin A, has a white color. White goat's milk and products based on it (without the yellow tint) the population mistakenly associates with low mass fraction of it fat. Therefore, the problem of change specific to the goat cheese - white to other colors - is relevant. The population of Ukraine also can not meet the short term storage of soft cheeses (both from cow and goat's milk) for a maximum of 5 days from the end of the process, in accordance with the requirements specified in the national standard of Ukraine [2].

Is known that for the production of soft cheeses various methods clotting milk, including methods acid rennet and acid coagulation researched and sufficiently described in the literature.

Thermoacid way to coagulate the milk is used less frequently, so it is less studied. The main advantage of this method is producing milk clot in a high recovery of proteins from raw milk, reaching 95 - 97% [3]. When using citric acid, acetic acid, whey, sea buckthorn, cherry or apple juice, by increasing the temperature pasteurization observed decrease in dry matter in whey obtained after separation from the clot. When using a mixture of whey and fruit juice in the clot becomes part of the coagulant protein, which in turn increases the output of the finished product [4].

In the manufacture of protein-fat products (cottage cheese and cheeses) produced inevitably a side (secondary) raw resource whey, which is released from casein dust and milk fat and by separation of whey proteins - denaturation with further sludge milk albumin or centrifugation. [5].

When used as a coagulant whey titratable acidity of 42-68 0 T required degree of isolation of the protein from the serum of 65-75% is achieved at a dose of coagulant in an amount of 49 - 53% [6].

Expansion of species and organoleptic characteristics of natural cheese using smoking to satisfy the consumers' request for snack cheeses. Depending on the temperature distinguish cold (40 0 C) of hot (from 80 to 180 0 C), and to receive hot



cheese temperature of 50 - 80 0 C. [7].

In the study of fatty acid composition "Digorsky" cheese and "Ossetia" with spicy and aromatic herbs (sage mutovchastym, lavender longifolia, lofandom anise), evaluated the content of saturated and unsaturated fatty acids. It has been found that the predominant triglyceride composed of the above cheeses are useful for the human oleic and palmitic fatty acids [8].

The results of research. In the semi-industrial environment of the department of technology of processing and standardization of animal products Kharkiv State Academy of Animal Health Control and manufactured prototypes of goat cheese thermoacid mode of production. To do this, use goat's milk - raw materials from the Zaanen breed and crossbred goats kept on the farm "Educational and Scientific Center" Kharkiv State Academy of Animal Health, the physico-chemical characteristics of which comply with a national standard on the goat's milk harvested [9]. Control variant milk processed cheese "Adygeyskogo" type technology, developed by experts of the Kharkiv State Academy of Animal Health [10], and experienced product options - based on it with Aromatic herbs - turmeric. Thus, in the milk in the manufacture of advanced varieties of cheese (O.1, O.2, O.3, O.4) were respectively weighed Aromatic herbs in an amount of 0,05, 0,015, 0,015, and 0,045 wt., %.

In particular, 2 liters (2 dm³) milk placed in a somewhat larger volume container (3 dm³) heated to a temperature of 50 0 C was added, respectively, 10, 30, 30 and 90 mg of grass. Heating was stopped when the milk reaches the temperature of 95 ± 2 0C. Thereafter, the walls of the container with hot milk evenly added in 10% serum acidity of 185 - 190 0 T (per each 2 liters of milk of 200 cm³ serum) was stirred and heated (before forming) at this temperature for 10 - 15 minutes.

After the coagulation process fat - protein portion, which was separated from the whey and floated on the surface of the container, which was carried out heating the milk, the product was carried out forming: collected clot bucket and carried it into the mold, made of stainless steel with holes

After the end of its forming process cheese was subjected to self-pressing cheese



with turning every 15 - 20 minutes. After 0.5-1 hours of self-pressing on the surface of the coated cheese table salt at the rate of 20 g of material per 1 kg of product, and cumin to decorate the product heads. That is, each of the heads contact 5 made cheese weighing about 300 grams, were applied to 60 mg of salt and cumin seeds 10 mg.

One of the five samples of cheese (O.3) containing 0.015% of aromatic herbal supplements - turmeric, was smoked with a smoking household devices.

"Gift" Physical-chemical and microbiological parameters 5 daily soft goat cheese rennet are shown in table 1.1.

Table 1.1

Physico-chemical and microbiological parameters 5 daily soft goat cheese "Gift"

Indicators	Results of analyzes of samples of cheese				
	Control	An experience			
	(C)	E.1	E.2	E.3	E.4
1	2	2	3	4	5
The content of turmeric in %	-	0,005	0,015	0,015 копченого	0,045
Physical and chemical indicators					
M. d. Fat in dry matter of the cheese, %	45,0±2,25	45,0±2,25	45,2±2,24	49,3±2,46	45,0±2,23
M. d. In cheese moisture,%	43,0±2,15	43,0±2,15	43,2±2,16	42,28±2,11	43,08±2,15
Active acidity, pH units the finished cheese	5,4±0,27	5,7±0,28	5,80±0,29	5,82±0,29	5,86±0,28
The yield of cheese 2 kg of goat milk, g	288±14,4	290±14,5	302±15,1	300±12 up smoking, 270 ± 10,8- after	310±15,5
Microbiological indicators					
Number MAFAnM	$5,2 \times 10^2$	$4,9 \times 10^2$	$4,0 \times 10^2$	$39,2 \times 10^2$	$4,3 \times 10^2$
Coliform bacteria	1×10^1	1×10^1	1×10^1	1×10^1	1×10^1

From Table. 1.1 shows that the increase in the amount of additives Aromatic herbs - turmeric contributes directly proportional reduction in the number of foreign microflora content - MAnFAnM and CGB (coliforms) in the finished product. In



addition, the herb additive effect on the increase in the active (reduced titratable) cheese acidity, which has a positive effect on the biochemical and microbiological processes in the production of advanced options of cheeses, cheese yield increase and improve their organoleptic characteristics.

Increasing the amount of turmeric sample introduced into the test sample (E.4) cheese in an amount of up to 90 mg did not result in a significant reduction in the amount of foreign microflora. Therefore, a rational M. e. Additives used in the processing of milk on a soft goat cheese, is 30 mg for 2 liters of milk, or 0.015 wt.%. Common typical goat cheese with white color in its manufacture of aromatic herbs, turmeric, changed to green - green or bright green.

In addition, the use of additives spicy - aromatic herbs, in the manufacture of advanced options of soft goat cheese, helped to increase product shelf life up to 8-10 days, ie, on 4 - 5 days more as compared the same period of the control. Prototype cheese (E.3) with 0.015% of turmeric, was treated with a hot smoked smokehouse at home for 20 minutes using smoke from aspen wood. In 300 g smoked during the above prototype goat cheese mass loss observed mass fraction (M. d.) Moisture 0.22%, which contributed to a reduction of its weight by 30 g (or 10 %).

Smoked cheese is an attractive brownish-greenish color, it received the highest praise from the tasters ballroom. The shelf life of smoked cheese increased (instead of 5 days, provided the requirement of national standard for soft cheese from goat's milk) to 8-10 days (with turmeric in its composition, but without the process of it smoked) and up to 25 days (with turmeric and smoked) , i.e., 2 - 5 times compared to the control

Conclusions

1. Established a rational dose (0.015 wt., %), The use of aromatic herbs, turmeric in the development of a new kind of technology of soft goat cheese under the code name "Gift".

2. Use of the above doses of aromatic herbs, in the manufacture of prototypes thermoacid cheese production process, followed by its smoking process, contributed



to improved microbiological, and organoleptic parameters increase its shelf life, respectively, in 2 and 5 times, compared with control.

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Аннотация

В статье представлены результаты исследований, направленные на изучение влияния пряно-ароматической травы – куркумы на улучшение качества мягкого козьего сыра термокислотного способа производства.

Ключевые слова: мягкий козий сыр, пряно-ароматическая трава - куркума, копчение, качество, срок хранения.

**j12-070****DOI: 10.21893/2227-6920.2017-12.070****UDK 620.952:662.75**

DIESEL FROM FOSSIL RESOURCES

Polishchuk V.N.*National university of life and environmental sciences of Ukraine**Heroyiv Oborony st., 15, Kyiv, Ukraine*

Abstract: Due to the depletion of oil humanity seeks noticed oil fuels. Replace diesel fuel oil have biodiesel, which refers to biofuels. However, from fossil resources can produce an alternative diesel fuel. Such synthetic diesel fuels relates fuels derived from coal processing, oil shale and biomass by Fischer-Tropsch synthesis; dimethyl ether feedstock for the production of which is natural gas, methanol and biomass. Also mixtures of fuel used for diesel engines: methane (or propane) and diesel fuel (15-30%); about 80% diesel, 20% water and 1% emulsifier with a special disperser treating the mixture; diesel, ethanol and 7-10%, 1-2% additives (marketed under the name of E-diesel).

Keywords: dimethyl ether, synthetic diesel fuel of, E-diesel, gas-diesel engine, the mixed fuel

Introduction.

As proven oil reserves left on the 45 years of production, the mankind has arisen an urgent need to look for substitutes petroleum fuels. For agricultural production is important to the delivery of diesel fuel, because the majority of agricultural diesel engines has. Already developed and produced analog of diesel fuel from renewable resources – biodiesel. However, it is possible to manufacture substitutes for diesel fuel from traditional resources such as coal and natural gas reserves of which slightly more than oil stocks.

Therefore, the *aim of our research is* to analyze the possibilities for barter oil-diesel fuel other types of fuels are made from fossil raw materials.

Results. Discussion and Analysis. Analogues of diesel oil, which is produced from fossil raw materials is di-synthetic diesel fuel, dimethyl ether and blends with



diesel fuel.

Dimethyl ether (DME) is an inert gas, which liquefies at a low pressure. DME in the liquid form resembles water. It is well sprayed, resulting in efficient combustion of the fuel; IME, a high cetane number (55-60), which reduces the delay period-of igniting; since virtually no sulfur, the emissions of oxides of its level is very low; It has good starting performance in cold weather. The main raw material for the production of DME is a gas. The use of DME as a fuel provides the processing power of the system (mouth, posing the LPG equipment, increase in the volume flow fuel pump, carburetion adjustments, seal piping)

However, a significant disadvantage of DME, which hinders its application is less calorific value (24,8 MJ/kg, compared to 42,5 MJ/kg of diesel fuel oil), which leads to a substantial increase in the volume flow of DME and reduce engine power. Furthermore, poor lubricating properties of DME. It is a strong solvent for the majority of the pain-rubber, so the sealing problem exists [1].

Synthetic diesel fuel derived from solid fossil fuel (such as coal or oil shale) by Fischer-Tropsch method or through an intermediate preparation of methanol [2]. First, by gasification or pyrolysis of the solid fuel is produced pyrolysis gas generator or from which, by purification from sulfur and nitrogen compounds obtained by the synthesis gas, a mixture of carbon monoxide and hydrogen in various proportions (but no higher than 1: 2). The gasification method or solid fuel pyrolysis is performed. The content of CO+H₂ in the gas mixture is about 85%. The synthesis is carried out in the presence of catalysts. Theoretical yield at complete conversion of hydrocarbons CO – 200 kg/m³ of gas [2]. The practical output of up to 85% of the theoretical [4].

A drawback of synthetic diesel fuel is a high content of unsaturated hydrocarbons (olefins), which disintegrate rapidly, becoming a part of resin. Therefore, for practical use of such fuel is mixed with fuel oils distillation. In addition, higher cost synthetic fuel from the oil.

Diesel fuel savings observed using O-fuel mixture. Production technology blends with diesel fuel that is used in Germany, is added to the diesel fuel oil to 20%



water and 1% emulsifier with a special disperser treatment mixture. The mixture can be used in conventional diesel engines without processing. Color mix – dull white. Shelf life after cooking – about three months [4].

A mixture of petroleum diesel with ethanol and additives produces under the European name for E-diesel. The leader in the use of ethanol in the composition of petroleum diesel is Sweden. The most used e-diesel is a mixture of conventional diesel, ethanol and 7-10% 1-2% anti-corrosion, stabilizing and cetane enhancing additives. To use such fuels do not need to make design changes in diesel engines. The calorific value of E-diesel by 3% lower than traditional diesel fuel, and specific consumption – 2,8% higher. Emission of nitrogen oxides, carbon monoxide and smoke particles below 2, 17 and 21% respectively. Swedish automaker Scania has adapted two of its diesel engine under fuel containing 90% ethanol. To do this, the details of the fuel pumps and injectors have been replaced, as well as applied to ethanol-resistant seal [5]. An analogue of E-diesel is available in the US under the brand name O2Diesel [4].

Also, the blending diesel fuel is used with the addition of 2% or 5% biodiesel. In Ukraine, the blending biodiesel is made according to DSTU 4840: 2007 "Diesel fuel high quality technical conditions", which provides for the production of blends with diesel fuel B5 with 5% addition of biodiesel [3].

Gas diesel engines operate on a mixture of methane (or propane) and diesel fuel (15-30%). On pure methane diesel engine can not work, because methane has a high auto-ignition temperature. Therefore, the diesel engine is required to feed gas to the cylinders of diesel fuel a quantity – portion which moves at the end of the compression stroke and ignites the gas-air mixture flowing into the cylinders on the intake stroke. In this engine start should be implemented only on the diesel fuel. For alteration of the diesel engine in the diesel engine need not only the installation of LPG equipment, but also a certain refinement of available fuel equipment. First of all, this concerns the high-pressure pump, which should provide a stable supply of small portions of diesel fuel at all engine operating conditions.



Summary and Conclusions

Analogues of biodiesel from fossil raw materials is a synthetic diesel fuels derived from coal processing, oil shale, and biomass by Fischer-Tropsch synthesis; dimethyl ether feedstock for the production of which is natural gas, methanol and biomass. Also mixtures of fuel used for diesel engines: methane (or propane) and diesel fuel (15-30%); about 80% of diesel fuel, 20% water and 1% emulsifier with a special treatment of a mixture in dispersion; diesel oil, 7-10% ethanol and 1-2% additives (issued under the name of E-diesel), diesel fuel from the addition of 2% or 5% biodiesel.

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j12-071

DOI: 10.21893/2227-6920.2017-12.071

UDC 621.311.019

ELECTRICAL POWER LINES RELIABILITY ASSESSMENT TAKING INTO ACCOUNT CLIMATIC INFLUENCES

УДК 621.311.019

ОЦЕНКА НАДЕЖНОСТИ ВОЗДУШНЫХ ЛИНИЙ ЭЛЕКТРОПЕРЕДАЧИ С УЧЕТОМ КЛИМАТИЧЕСКИХ ФАКТОРОВ

Elfimova O. I., Shevchenko N. Yu., Soshinov A.G. / Елфимова О. И., Шевченко Н. Ю.,
Сошинов А.Г.

Камышинский технологический институт (филиал) ВолгГТУ

Волгоградская обл., г. Камышин, ул. Ленина 6а, 403870

Kamyshin institute of technology (branch) of the Volgograd state technical university,

Volgograd Region, Russia, Kamyshin, of Lenin St. 6a, 403874

Abstract: The article justifies a methodology for determining parameters of overhead power lines reliability index subject to climatic factors. The technique is based on a differentiated assessment of reliability of individual factors which can determine more accurately reliability indices with a limited number of statistical data.

Keywords: reliability index, monitoring of overhead lines, emergency modes, limiting probability theorems.

Introduction

When designing smart power networks, which should automatically identify the most dangerous emergency-prone sections of a network, and then to prevent accidents and to reduce losses they should change the characteristics and the circuit layout, the main problem is the information about the reliability of networks. The feature of defining indices is the fact that the reliability of electric networks is affected by a large number of different factors: the construction of poles, wire types, terms of use, climatic conditions, etc. At the present time reliability indices from reference manuals and books are used to assess the reliability of electric networks. However, these figures are averaged over the regions, seasons, etc. So results of a



calculation can not reliably reflect the real situation and therefore activities to improve power supply reliability and reduce emergency operation cannot be held reasonably.

Factors affecting reliability of electrical networks

Overhead power lines (OL) are the most damage-prone elements of electrical networks due to the territorial extent and exposure to climatic influences. Their failure flow parameter is much higher than those of transformers and circuit breakers. [1]

The number of failures per 100 km of OL a year due to all reasons for elements of an electrical network is shown in Table 1 [2].

Table 1

Failure flow parameters due to all failure causes per 100 km of OL

Overhead power lines	Failure flow parameters, ω , [failure/a year]					
	Voltage, [kV]					
	35	110	220	330	500	750
One-circuit	2	3,9	1,7	1,3	0,6	0,6
Two-circuit (failure of one circuit)	1,6	3,9	2	3,8	-	-

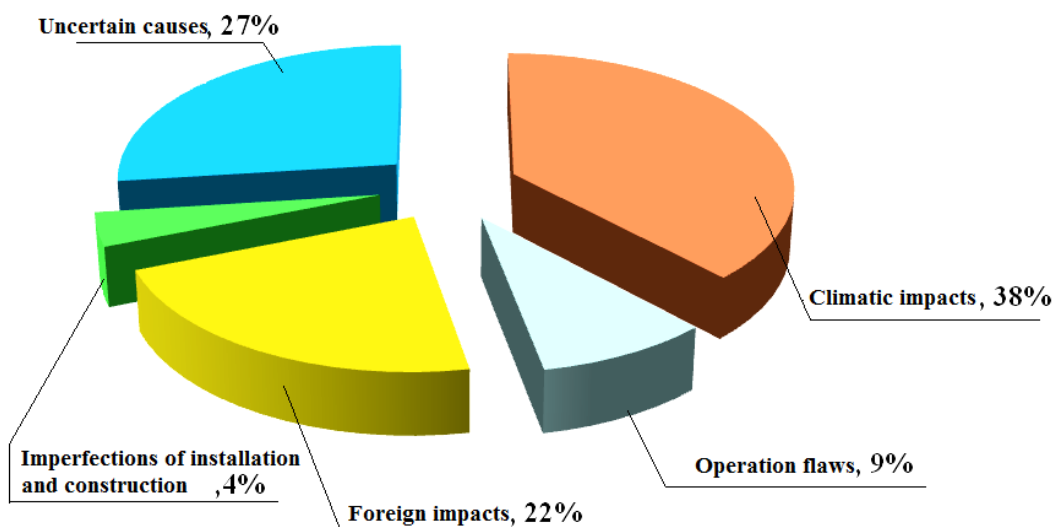


Fig. 1. Distribution of failure of 35-500 kV OL main elements due to causes as a percentage of the total number of failures



The causes of damage to overhead power lines are mainly the following factors: aging of equipment (material properties change); design shortcomings; defects in design and manufacture; installation defects; operating disadvantages; foreign influence; climate impacts (atmospheric surges, changes in ambient temperature, the effect of wind on wires, glaze formation, vibrations and "dance" of wires, air pollution, effects of geomagnetic storms). Failures caused by influence of climate impacts are on the order of 40% (Fig. 1). The most severe are icing and wind effects. [3].

The share of overhead line failure due to exposure to icing and wind loads as a percentage of the total number of failures for all reasons is given in Table 2.

Table 2

The number of failures of overhead power lines due to glazed frost in [%] of the total number of OL failures due to all causes

Voltage, [kV]	35	110	220	330	500
Number of failures in [%]	2	3,9	1,7	1,3	0,6

To assess the reliability of overhead power lines, subject to the influence of external factors it is advisable to use the method of correction factors. Failure flow parameters of primary elements are multiplied by a correction factor, the value of which is determined by weather conditions and time of year. As background information, it is advisable to use maps of climatic conditions on the wind and icing and wind loads.

Increasing reliability when processing statistical data

Overhead line reliability indices depend on a large number of external influence, often independent factors. Differentiation of influencing factors will permit to determine reliability more accurately and with fewer statistical data. All random process can be represented as a sum of random processes.

According to the central limiting theorem, the distribution law of a sufficiently large number of independent random variables (subject to certain non-rigid limitations) is arbitrarily close to the normal law. Practically the central limiting



theorem can also be used when it is a sum of a relatively small number of random variables. In the summation of independent random variables which are comparable in their dispersal, with an increase in the number of summands the law of sum distribution very soon becomes approximately normal. In practice, in general, replacement of some distribution laws by other ones is widely used; at the relatively low accuracy, which is required from probabilistic calculations, the substitution can also be done very approximately. Experience shows that when a number of summands is on the order of ten (and often less), the law of sum distribution can be replaced by normal law. Here are the basic relations of probability theory [4, 5].

If X_1, X_2, \dots, X_n are independent random variables with mathematical expectations of m_1, m_2, \dots, m_n - and variances D_1, D_2, \dots, D_n and the conditions of the central limiting theorem (values of X_1, X_2, \dots, X_n are comparable in order their influence on the sum dispersion) and the number of summands n is enough to regard

size distribution law $Y = \sum_{i=1}^n X_i$ as approximately normal, then the probability for a random variable Y to fall within the area (α, β) is given by:

$$P(\alpha < Y < \beta) = \Phi^* \left(\frac{\beta - m_y}{\sigma_y} \right) - \Phi^* \left(\frac{\alpha - m_y}{\sigma_y} \right), \quad (1)$$

where m_y, σ_y are a mathematical expectation and a standard deviation value of Y , Φ^* is a normal distribution function.

According to the addition expectation and variance theorems the parameters of random variable Y are given by:

$$m_y = \sum_{i=1}^n m_i ; \quad D_y = \sum_{i=1}^n D_i ; \quad \sigma_y = \sqrt{D_y} = \sqrt{\sum_{i=1}^n D_i} . \quad (2)$$

Thus, to find an approximate likelihood of getting of a large amount of random variables at a predetermined portion, it is not required to know distribution laws of these values, it is sufficient to know their characteristics. Knowing parameters of independent random variables X_1, X_2, \dots, X_n , one can calculate the parameters of the random variable Y .

It is obvious that each component has a smaller square deviation and therefore a



smaller number of samples is required. Mathematically, this relationship is described by the Chebyshev inequality [4,5]. Given a sufficiently large number of independent experiments arithmetic mean of the observed random variable converges in probability to its mathematical expectation.

Arithmetic mean of the random variables X_1, X_2, \dots, X_n

$$Y = \frac{\sum_{i=1}^n X_i}{n}, \quad (3)$$

has numerical characteristics of $m_y = m_x; D_y = \frac{D_x}{n}$.

From the Chebyshev inequality for the random variable Y

$$P(|Y - m_y| \geq \varepsilon) \leq \frac{D_y}{\varepsilon^2} = \frac{D_x}{n\varepsilon^2}, \quad (4)$$

it follows that no matter how small the number ε is, we can determine the number n to fulfill the inequality

$$\frac{D_x}{n\varepsilon^2} < \delta,$$

where δ is an indefinitely small number.

Therefore, there are two ways to increase the accuracy of reliability analysis: by increasing the number of samples and by reducing variance. Since the number of samples, namely the number of emergency operations is limited; dispersion can be reduced by breaking the process into separate components by external factors.

Evaluation of reliability subject to climatic influences

Traditionally, failure rate is considered as a constant (constant) for each component of the network averaged for the entire territory of Russia [1]. In practice, it appears that service loads, environmental conditions and service life period exert an individual impact on the frequency of disconnections of each network component. For example, the frequency of the air line outages depends essentially on the route laid as the failure probability of a line network in a forest zone is significantly higher than in the field.

Line differentiation in time and space is proposed [6, 7, 8]. The line is divided

into zones according to glaze, glaze-wind and wind loads. Each zone is assigned a partiality coefficient (Fig. 2). For example, Zone S_1 has wind area IV, glaze-wind load area II, ice thickness area II; zone S_2 has wind area IV, glaze-wind load area II, ice thickness area IV, and so on.

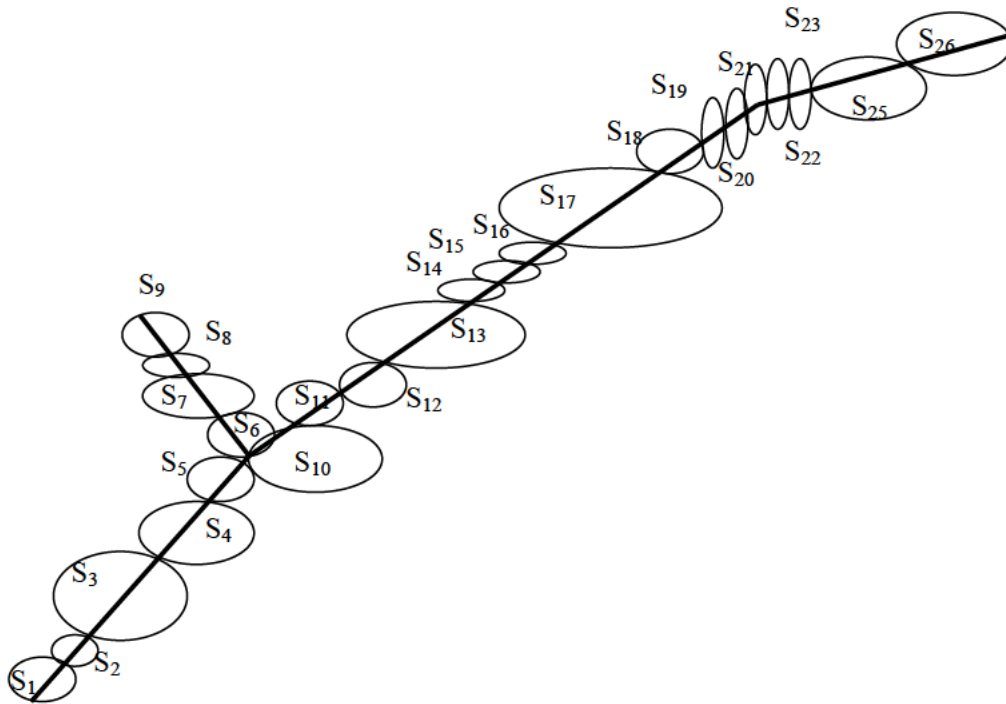


Fig. 2. Breaking a power line into portions of [6, 7, 8]

The time of year when the accident occurred is also taken into account . The model coefficients are adjusted depending on the time of year and the loads experienced by the line (Table 3).

Table 3

Weight coefficients of power line outages

Time of year	Climatic loads	Weights of partial coefficients for zones				
		$k(S_1)$	$k(S_2)$	$k(S_3)$...	$k(S_n)$
spring, summer, autumn	wind	k_{1_1}	k_{2_1}	k_{3_1}	...	k_{n_1}
winter	wind	k_{1_1}	k_{2_1}	k_{3_1}	...	k_{n_1}
	glaze-wind	k_{1_2}	k_{2_2}	k_{3_2}	...	k_{n_2}
	glaze	k_{1_3}	k_{2_3}	k_{3_3}	...	k_{n_3}



Failure flow parameter is determined individually for each component based on the partial outages weight coefficients [6, 7, 8].

$$\omega = k_{1_1} \dots \cdot k_{n_1} \cdot \omega_1 + k_{1_2} \dots \cdot k_{n_2} \cdot \omega_2 + \dots + k_{1_n} \dots \cdot k_{n_n} \cdot \omega_n, \quad (6)$$

where $\omega_1, \omega_2, \omega_n$ are partial coefficients of component outages, [1/a year];

$k_{1_i}, k_{2_i}, k_{n_i}$ are weights of i partial coefficients of outages;

ω is a general parameter of model component failure flow, [1/year].

The partial coefficients are calculated depending on the length of the transmission line section, the parameters of failure flow in this area and on the line service life.

Thus, the reliability evaluation is a difficult task, since many factors are to be considered. Reliability indices calculations must be carried out on the basis of statistical data. For more accurate calculations with a small number of initial data it is useful to differentiate external factors affecting the reliability. Currently, the collection of data on accidents is conducted according to RD 34.20.801-2000 "Instructions for investigation and taking into account of technological disruptions of power systems, power plants, boiler-houses, electric and thermal networks." The main types of documents in the collection of primary data on failures of the system elements are logs, forms, cards. The structure of data representation in tabular form is designed for manual processing. This form does not make it possible to analyze the current level of reliability and forecast the subsequent state of the system. In addition, this documentation is practically closed, often hiding information about emergency conditions which adversely affect the objectivity of this information. Therefore, to objectively reflect the current technical state of the system, to calculate reliability it is necessary to implement an automated system for collecting and processing information.

The practical value

The proposed method enables to obtain the most accurate indices of reliability of an electrical network and choose the most optimal solutions to prioritize reconstruction and modernization of power networks and repair work.



Conclusions

Based on the analysis of the problems of reliability evaluation it has been revealed that the development of techniques requires a differentiation of factors affecting the reliability indices (the technical condition of the line, climatic and geographical location, time of year).

To implement the method of reliability calculation and forecasting the technical state of the system it is necessary to introduce an automated system for collecting and processing information using modern achievements of information-measuring system to control emergency operation.

One of the central tasks of designing information-measuring systems to control overhead lines (OL) is a rationale for the selection of places and spatial frequency of emergency operation sensors. The developed method can reasonably determine places of emergency mode sensor installation and reduce the time to find and eliminate accidents.

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Аннотация:

В статье проведено обоснование методики определения показателей надежности воздушных линий электропередачи с учетом климатических факторов. Методика основана на дифференцированной оценке надежности от отдельных факторов, что позволяет более точно определять показатели надежности при ограниченном числе статистических данных.

Ключевые слова: показатели надежности, мониторинг воздушных линий, аварийные режимы, предельные теоремы теории вероятностей.



TRANSPORTATION

j12-058

DOI: 10.21893/2227-6920.2017-12.058

PECULIARITIES OF CARGO TRANSFER IN THE OPEN ROADSTEAD ОСОБЕННОСТИ ПЕРЕВАЛКИ ГРУЗОВ В «ОБЛАЧНЫХ ПОРТАХ»

Muradian A / Мурадьян А.О.

Rusanova S / Русанова С.С.

Odessa National Maritime University, Odessa, Mechnikova 34, 65029

Одесский национальный морской университет, Одесса, ул.Мечникова 34, 65029

Abstract. The rapid growth in bulk shipments over the last twenty years has had a significant impact on handling of bulk cargo. At the same time, the depths of the most berths of the Black Sea ports are not sufficient to handle modern bulkers. One of the solutions to the problem is the transshipment or loading of large-capacity vessels in the open roadstead. To spend less on freight, and sometimes to enter new sales markets, trade companies need to increase the ship's lot. However, the process of accumulation and storage of consignments in one place is enough time-consuming. Based on the foregoing, it would be more convenient for a cargo owner to work through several ports, especially when it comes to grain cargoes that have a pronounced seasonal character. At the peak of the season, part of the cargo flow can be reoriented to less busy ports with "shallow water", and the transshipment will play the role of a rescue circle for ports that do not have the capacity to handle large-capacity vessels.

Key words: «cloud» port, transshipment, combined loading, a small-tonnage vessels, rail and road transport.

The main text

Let's consider two export schemes: full loading of a sea-going vessel in the roadstead and partial loading of a sea-going vessel in the port with subsequent loading of it in the roadstead. There is no direct competition of these schemes, the advantage of this or that scheme, first of all, depends on the place of origin of the cargo. Combined loading is used, if necessary, to load larger ships of the Panamax



type and more.

Raid transshipment is not an alternative to the classical scheme of loading sea vessels, on the contrary, it opens up new opportunities.

Let's list the following main advantages of the raid handling:

- absence of restrictions on the size of vessels and their draft;
- absence of port charges (or depending on the place of loading, only the anchorage fee can be charged);
- There is no order for the berth;
- It is possible to form a ship lot in several small "feeder" ports, and at the peak of the season, the part of the cargo flow should be reoriented to less busy ports with "shallow water";
- there is no loss of time for incoming formalities;
- Environmental safety is ensured, because transshipment takes place away from human habitats;
- An adequate rate for transshipment is proposed as compared to deep-water ports;
- There are no problems associated with impersonal grain, the trader sends the buyer exactly the load that he brought.

Of course, there are shortcomings of cargo transshipment in the roadstead. First of all, its development is hampered by the lack of river tonnage and the generally unsatisfactory state of the river fleet. There are difficulties associated with the docking of river and sea tonnage. The dependence on weather conditions is higher in comparison with the conventional ports. There are some additional costs associated with the delivery to the roadstead of the cargo owner representatives.

Today, the term "cloud port" is very often used to understand how this port will look like, it is enough to imagine the open sea. There are no berths and terminals that are usual for the classical port. And there are several floating cranes and marine specialized transshipment vessels, which transship directly in the open sea. In addition, a permanent technological chain has been established, consisting of mixed vessels, tugs, auxiliary vessels and their location and sludge [1–4].



In the eighties, the transshipment of this scale operated in the port of Ust-Dunaisk.

At present, when delivering cargo of a large sea tonnage, there are three or even four transshipments. The first loading is from the elevator to the rail or road transport, which, destroying the roads, delivers it to the port. The second transshipment takes place in the port - into the elevator. And the third - from the elevator to the ship. If the vessel is underloaded, then the fourth operation is the loading in the roadstead to the full carrying capacity of the vessel.

When working through the "cloud port" the number of operations carried out during the delivery of cargo is reduced, which brings substantial savings to the business. The scheme is as follows: cargoes in small batches of low-tonnage fleet of mixed voyage descend into the sea, and in the roads of the new port they are loaded into large sea tonnage vessels. The new port will allow to accept heavy vessels such as Panamax, Postpanamax and even Kepsiz (up to 100,000 tons).

It is important that the cargo arriving from the river does not enter the usual seaport at all, but immediately gets into the raid transshipment. This allows you not to pay large port charges. of mixed navigation up the river can send container and other associated cargo. That is, the flow of goods is provided in both directions.

Today in Ukraine, the transshipment is carried out in the area of the Trutaev bank, the possibilities of which are substantially limited. Because of the shallow depths, this place does not allow you to enter the raid for ships with a large draft. In addition, the navigation in this place is very intensive and raid is designed for a small amount of cargo, and there is simply no place to expand it. Therefore, the creation of a port through the development of an existing raid is impossible.

Summary and Conclusions

Thus, the creation of "cloud ports" firstly, will increase the transshipment capacity. Even nowadays, there is a noticeable shortage of transshipment capacities in Ukrainian ports, especially in November-December, and the handling of a new transshipment port solves this problem for years to come.

The second important stimulus is the activation of cargo transportation along the



Dnieper. On the national scale, there are two major economic benefits from the transition of goods from roads to the river: reducing the cost of road rehabilitation and reducing emissions into the environment. Every million tons of cargo, transferred to the river, saves UAH 790 million for repairing the road surface! Moreover, when the same million tons of cargo is transported by river transport, rather than by road, fuel economy amounts to over 2,500 tons (70%), and emissions into the atmosphere are reduced by 8,200 tons (by 70%).

Investments in the creation of a medium-sized grain terminal on the shore may be sufficient to build 100 modern barges for mixed navigation. And shipbuilding means new jobs and development of production, which contributes to GDP growth. Thus, the emergence of a new port is also a step from the raw material economy to production with added-value. The idea of building a "cloud" port is that virtually nothing is built, and only conditions are created.

Аннотация

Быстрый рост размерений балкеров в последние двадцать лет оказал существенное влияние на технологии перевалки насыпных грузов. При этом глубины у причалов большинства портов Черноморья недостаточны для обработки современных балкеров. Один из вариантов решения проблемы — перевалка или догрузка на рейде крупнотоннажных судов. Чтобы тратить меньше на фрахте, а порой и для выхода на новые рынки сбыта, торговым компаниям необходимо увеличивать судовую партию. Однако процесс накопления и складирования в одном месте партии груза достаточно трудоемкий. Исходя из вышеизложенного грузовладельцу было бы удобнее работать через несколько портов, особенно когда речь идет о зерновых грузах, имеющих ярко выраженный сезонный характер.

Инвестиции в создание на берегу зернового терминала среднего размера может быть достаточно для постройки 100 современных барж смешанного плавания. А кораблестроение - это новые рабочие места и развитие производства, которое способствует росту ВВП. Таким образом, появление нового порта - это еще и шаг от сырьевой экономики к производству с добавленной стоимостью. Идея строительства "облачного" порта в том, что фактически ничего не строится, а создаются лишь условия.

Ключевые слова: «облачный» порт, траншипмент, комбинированная погрузка, малотоннажные суда, железнодорожный и автомобильный транспорт.

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TOURISM AND RECREATION

j12-002

DOI: 10.21893/2227-6920.2017-12.002

УДК 379.85

MODERN TOURISM IN THE DIALOGUE OF CULTURES

СОВРЕМЕННЫЙ ТУРИЗМ В ДИАЛОГЕ КУЛЬТУР

d.p.s., as. prof. Aranasjuk L.A. / д.п.н., доц. Апанасюк Л.А.

Russian State Social University, Moscow, V. Peak st., 4, build 1

Российский государственный социальный университет, Москва, ул. В. Пика, д.4, стр.1

Abstract: The article is devoted to consideration of the question of dialogue of cultures in modern touristic activities, where it's essential the knowledge of many moments and events of a cultural environment: the behavior patterns, concepts and values, comprehension of communication forms within the intercultural environment, skills and ability of willingness formation and the power to successfully establish, strengthen and improve intercultural relations and intercultural dialogue with representatives of another culture.

Keywords: the dialogue of cultures, touristic activities, intercultural communication, modern tourism.

Introduction.

The acceleration of processes of society globalization leads to in all fields of life. And tourism in modern world, being intercultural and transnational phenomenon, has become an affordable way of acquirement the environment and cultures through intercultural communication.

The main text.

Within the context of our study of the dialogue of cultures is considered as a form of intercultural communication and a smoothing tool for interethnic, international, interfaith and interracial contradictions, the motion towards peace, development, solving preservation of cultural diversity objectives and as a strategy of cultural policy of states in a multicultural world.

With the expansion of international contacts in the dialogue of cultures has



become an organic part of the tourism as the system and the dominant key of international tourism activity, which is part of the global process of internationalization of socio-economic relations. An integral part of the international tourism activities – preservation the identity and singularity of separate culture and its natives. At the same time any intercultural communication- this is sort of the contraposition and interpenetration of ethnocultural identities. The more extensive cultural mobility and coverage of intercultural communication in tourism organization, able to navigate in the needs of different societies and to consolidate the values of different cultures, the more successful and effective will be the organization in the international tourist market.

Intercultural dialogue in modern tourism unites participants of the communication process and acquaints them to the peculiarities of different public institutions belong to the communicators. Interaction, or socio-cultural collaboration between people, manifested in the mutual penetration and interweaving of intercultural actions of different persons is a component of external environment that has influence on communication. Intercultural interaction on a symbolic level determines and shapes human behavior, so it is necessary to understand the sense which the person empowers his and others ' actions in order to correctly comprehend his actions. The behavior of each individual is predetermined by its culture and inclusion in the system of social relations. Each participant in the intercultural dialogue has its own system of rules that is based and created with support on its sociocultural identity. That is why natives of different cultural features have to overcome language barriers and non-language barriers of ethno-cultural specifics of understanding and appreciation of the environment, as well as special typical pantomimic and facial codes and individual peculiarities of thinking of representatives of different cultures.

Summary and Conclusions.

The author believes that the development of modern tourism in the dialogue of cultures requires knowledge of many highlights and events of a other cultural environment: the behavior patterns, concepts and values, comprehension of



communication forms within the intercultural environment, oral and written, personal and social, verbal and non-verbal and other forms of communication, as well as the skills of formation of readiness and ability to successfully establish, strengthen, and improve the quality of intercultural relations and intercultural dialogue with representatives of another cultural environment.

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Аннотация.

Введение. В статье сделана попытка рассмотрения туризма как транснационального явления, который стал доступным способом познания окружающей действительности и культур с помощью межкультурной коммуникации.

Основной текст. Межкультурный диалог в современном туризме объединяет участников процесса коммуникации и знакомит их с особенностями разных общественных институтов, к которым принадлежат коммуникаторы. У каждого участника



межкультурного диалога существует своя система правил, которая базируется и создается с опорой на его социокультурную принадлежность. Вот почему носителям различных культурных особенностей приходится преодолевать и языковые барьеры, и неязыковые – барьеры этнокультурной специфики понимания и оценки окружающей среды, а также особенные характерные пантомимические и мимические коды и индивидуальные особенности мышления представителей разных культур.

Выводы. Авторы уверены, что для развития современного туризма в диалоге культур необходимы знания многих моментов и явлений иной культурной среды: моделей поведения, понятий и ценностей, понимание форм коммуникаций внутри инокультурной среды, устных и письменных, личных и социальных, вербальных и невербальных и пр. форм коммуникации, а также умений и навыков формирования готовности и способности с успехом устанавливать, укреплять и повышать качество межкультурных взаимоотношений и межкультурного диалога с представителями другой культурной среды.

Ключевые слова: диалог культур, туристская деятельность, межкультурная коммуникация, современный туризм.

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Article sent: 13/02/2017 of

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j12-050

DOI: 10.21893/2227-6920.2017-12.050

**GEOGRAPHICAL DATA BASE OF AREA HOTEL BUSINESS AND
IT'S USING IN TOURUSTIC ACTIVITY****ГЕОГРАФІЧНА БАЗА ДАНИХ ГОТЕЛЬНОГО ГОСПОДАРСТВА
ОБЛАСТІ ТА ЇЇ ВИКОРИСТАННЯ У ТУРИСТИЧНІЙ ДІЯЛЬНОСТІ****s.g.s, Shyan D. V. / к.г.н. Шиян Д. В.****s.g.s, Lakomova O. Y. / к.г.н. Лакомова О.Й.***Kryvyi Rig State Pedagogical University, Kryvyi Rig, Gagarina 54, 50000**Криворізький державний педагогічний університет,**Кривий Ріг, Гагаріна 54, 50000*

Abstract. *Modern geographically-informational technologies, which are spreading in many different species can be effectively used in hotel business. It was made a first, for this territory and knowledge specie, trying to adapt a methodic of elementary geographically-informational system (EGIS) for creating geographical data base of hotel business in Dnipropetrovsk area. It was used, as a geographical data, area`s map with a scale 1:1000000. There were used, as the atributical, data statistics of area`s statistics department, which were integrated in special indicators and written in present data base places. According to data base indicators are connected with the separate objects (cities, areas) of firstly vectored map by using a hyperlinks method. This connection does the functions of EGIS in interactive mode for every user. Ready product can be used in work of the hotel business industry.*

Key words: *geographically-informational technologies, system, hotel business, data base, vector.*

Introduction.

Geographically-informational technologies aren't only the most informational, but innovational technologies, that it says about effective using in many species. The main body these technologies are in geographical "linkage" of some necessary information to separate places with follow-up manipulation by this information. The main preferring consists in a particular coordinating "linkage". On a first side, it must



be a particular coordinative place model, on another side – information, that is connecting. The first function in geographical sciences played a map – firstly paper, but now it is an electronic (digital). The second function makes by using many different data bases, which make, in fact, the thematic geographically-informational system (GIS) is depending [5].

Modern GIS are complicated complex of combining of geodesic cartographic sciences, cosmic and informational technologies. So, they were and will be too much an expensive innovative licensed product.

Paying an attention on that fact, that the main part of GIS are made abroad (USA, Canada, Holland, Germany and etc.) and one Desk-top-version of the modern popular GIS «MapInfo» can be to cost near \$5000, for national user is very heavy burden acquisitioning in Ukraine the modern GIS. This leading contradiction from necessity not to lag behind modern technologies and impossibility to buy them, unfortunately, which will be increased in a nearest future.

With the purpose to overcome the designated contradiction, in the end of 1990-th years, was developed a simple GIS, that adapted in standard «MS Office», therefore, text processor «MS Word» and spreadsheets «MS Excel». At the same time the main preferences of GIS advantages are saved. These are digital map, data base of attributive information, possibility to make a visualization of a digital map on a smartphone with Android operational system, and high quality of printing the paper images.

So, when we have been developing the geographical database / EGIS (elementary GIS by S. P. Sonyiko) of hotel economy of the Dnipropetrovsk region we used a methodic that said in many works [4; 6; 7].

The real experience of authors in application of these technology but in other subject domain became one more motive of use GIS technology at a research of hotel economy [3; 8].

Novelty aspect of our research is application for the first time this technique to hotel economy as to the main object of a research.

Research methodic. As the work maps, where will be seen the separate themes,

are used the maps of administrative areas and area cities' map. (image.1,2).

The maps of Dnipropetrovsk area with a scale 1:1000000 were the cartographical basis of created by us GIS, they vectored in a text processor «MS Word» [1]. As working maps are using also maps of administrative regions and cities of area, the separate subjects will be to display there (fig.1,2).

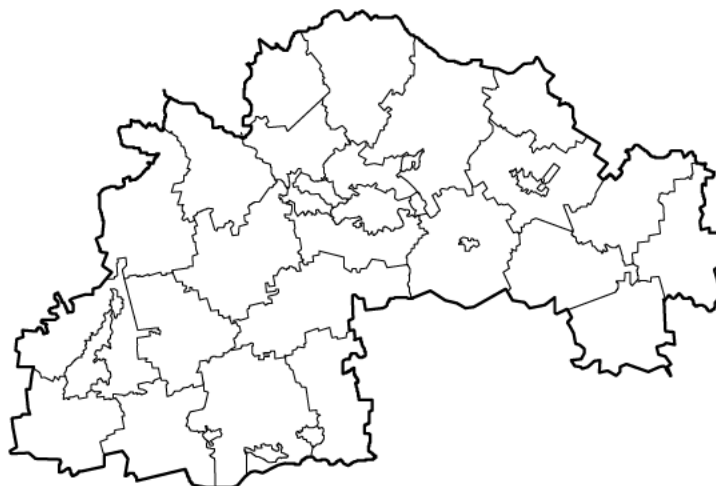


Figure 1. The boundaries of administrative districts



Figure 2. The cities of Dnipropetrovsk area

The base of attributive information for EGIS have served a data of regional statistic department in Dnipropetrovsk area about collective resources of the arrangement of tourists.

Considering that EGIS is an open system, it is develops and works in a usual text editor "Word" [4], the possibility active use it for organization of multi-day tours is appear. Its creation and using are considerable simplicity that the ordinary consumer and also tour operator (to the guide or travel company) allow to use it actively.



The main text. We will show the sequence of development of EGIS for the hotel economy of the Dnipropetrovsk region.

1. According to regional statistic department of Dnipropetrovsk region [2] the tables of database are formed (tab.1). At the same time the number of fields (columns) in the database (n) corresponds to the number of attributes are characterized the object of hotel economy. In this case 54 semantic attributes are characterizing the flow of tourists.

Table 1

The database the hotel economy of Dnipropetrovsk region

Districts	Number of nights	In hotels and similar placements	Special placements			
<i>1</i>	<i>2</i>	<i>3</i>	<i>4</i>	<i>5</i>	<i>...</i>	<i>n</i>
Apostolivskiyi	38061	9265	28796			
Verchnyodniprovskiyi	75353	6005	69348			
Dnipropetrovskiyi	6137	1698	4439			
Kryvorizkiy	257611	–	257611			
Magdalynivskiyi	599	599	–			
Mezhivskiyi	720	720	–			
Nikopolskiy	2934	2934	–			
Novomoskowskiy	256183	4136	252047			
Pavlogradskiyi	82714	505	82209			
Petrykivskiyi	40019	–	40019			
Petropavlivskiyi	428	–	428			
Pokrovskiyi	–	–	–			
Piatychatskiy	833	833	–			
Tsarychanskiy	3261	2641	620			

Specifically, these are the most important attributes:

- the number of visitors in year-round means of placement on the region's cities;
- the total number of visitors in hotels in a year;
- the total number of clients in a year in hostels;
- the total number of clients in a year in other means of placement (motels, hosted, hostels and other);



- the number of visitors in year-round means of placement on the region's districts;

- distribution by means of placement of foreigners;
- the number of nights spent placed persons\$
- the average duration of stay in collective means of placement;
- the use of collective means of arrangement of placement.

2. A system of symbols for creation of the electronic map of hotel economy of Dnipropetrovsk region is developed.

3. The method prompts (if necessary) is possible as "binding" other information about the object (images, expanded text, video and soundtrack).

3. The hyperlink is created, it "ties" to a fixed spatial object (the city or the area) the certain fields or records of the database by tool "the hint". After that there is possible an obtaining information on the list of objects of hotel economy (by guidance of the cursor on the corresponding object in a separate next window, where the hint is "emerges"). By a hint method (if necessary) is possible "binding" other information about an object (images, expanded text, video and soundtrack).

Final part. Use of a standard package "MS Office" in the development and practical application of geographical databases will allow to the user not only to prevent costs of acquisition an expensive special software, but will give the chance by means of simple and clear procedures which are carried out in a usual text editor, to constantly update information in the database data.

Conclusions. The created elementary GIS of hotel economy Dnipropetrovsk region in the future will allow:

- it being the open system, to become constantly renewable database from hotel economy, and therefore an effective tool of the organization of tourism;
- to be an independent commercial product in the form of DVD (and eventually annexed to Android) which travel companies will become interested;
- to perform educational functions at training of specialists in tourism;
- to be the methodical tool for development of similar software products on other areas and regions of Ukraine.



Анотація.

Сучасні геоінформаційні технології, які набувають поширення в різних галузях, можуть бути ефективно використані в готельному бізнесі. В статті здійснена спроба адаптувати методіку елементарної геоінформаційної системи (ЕГІС) до створення географічної бази даних готельної справи у Дніпропетровській області. У цій галузі знань і для цієї території така спроба робиться вперше. В якості, власне, географічних даних використана карта області масштабом 1:1000000. В якості атрибутивних використані статистичні дані обласного управління статистики, які інтегровані в спеціальні показники і записані у відповідні поля бази даних. До окремих об'єктів (міст, районів) попередньо векторизованої карти, методом гіперпосилань прив'язуються відповідні показники з бази даних. Така прив'язка забезпечує користувачу функціонування ЕГІС в інтерактивному режимі. Розроблений продукт може бути використаний у діяльності туристичних агентів.

Ключові слова: геоінформаційні технології, система, готельне господарство, база даних, векторний.

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Article sent: 31/03/2017 of

Dariya Shyan

Olena Lakomova



PHYSICS AND MATHEMATICS

j12-012

DOI: 10.21893/2227-6920.2017-12.012

ON STABILITY OF THE STRONG SOLUTION OF THE AUTONOMOUS
STOCHASTIC PARTIAL DIFFERENTIAL EQUATION

WITH RANDOM PARAMETERS

ОБ УСТОЙЧИВОСТИ СИЛЬНОГО РЕШЕНИЯ АВТОНОМНЫХ
СТОХАСТИЧЕСКИХ ДИФФЕРЕНЦИАЛЬНЫХ УРАВНЕНИЙ
В ЧАСТНЫХ ПРОИЗВОДНЫХ СО СЛУЧАЙНЫМИ ПАРАМЕТРАМИ

с.ph.-math.s., as. prof. Yurchenko I.V. / к.ф.-м.н., доц. Юрченко И.В.

ORCID: 0000-0001-9929-5758

d.ph.-math.s., prof. Yasynskyu V.K. / д.ф.-м.н., проф. Ясинский В.К.

ORCID: 0000-0001-5434-6427

*Yuriy Fedkovych Chernivtsi National University
Department of the System Analysis and Insurance and Financial Mathematics
28 Universitetskaya Street, Chernivtsi 58012, Ukraine
Черновицкий национальный университет имени Юрия Федьковича
кафедра системного анализа и страховой и финансовой математики
ул. Университетская, 28, Черновцы, 58012, Украина*

Abstract. The existence of a strong solution of the linear stochastic partial differential equation (LSPDE) in the corresponding space with random parameters is proved. The sufficient conditions are obtained for the asymptotic stability and mean square instability of the strong solution of the LSPDE.

Keywords: stochastic partial differential equation, mean square stability, asymptotic stability.

Introduction. Deterministic partial differential equations were considered by many authors, see, for example, [1–3] and bibliography therein.

Since the concepts of stochastic differential and integral and change of variables for a stochastic differential have been introduced and a strong solution to a stochastic differential equation (SDE) has been defined in the well-known monographs [4–6] and then propagated to classes of stochastic functional differential equations [7–9]



(see the extensive bibliography in these studies), it became possible to investigate an asymptotically strong solution for SPDE (see, for example, [5, 10–12], etc.).

The further analysis of SPDE involves the construction of mathematical models of complicated real systems, which need random parameters to be considered in these equations (see [6, 7, 12, 13], etc.).

In the paper, we will analyze the asymptotic behavior of strong solution of LSPDE taking into account random parameters in the right-hand side [10, 12].

1. PROBLEM STATEMENT

Consider a stochastic experiment with the basic probability space [1, 4, 5, 7] $(\Omega, \mathcal{F}, \mathbb{F}, \mathbb{P})$, $\mathbb{F} \equiv \{\mathcal{F}_t, t \geq 0\}$ is filtration, where function $u(t, x, \omega) \in \mathbb{R}^1$ is given, which is measurable with probability one in t and x with respect to the minimum σ -algebra $\mathcal{B}([0, T], \mathbb{R}^1)$ of Borel sets on the plane [13] and for which

$$\int_{-\infty}^{+\infty} \mathbb{E} \left\{ |u(t, x, \omega)|^2 \right\} dx < \infty \tag{1}$$

for all $t \in [0, T]$, $\mathbb{E}\{\cdot\}$ is expectation [14], and $T \in [0, \infty)$. Denote by \mathfrak{M}_T the space of function $\{u(t, x, \omega)\}$, which possesses the integrability property (1).

Introduce the norms [6, 15]:

$$\|u(t, x, \omega)\|_{L_{2\mathbb{R}^1}}^2 \equiv \int_{-\infty}^{+\infty} |u(t, x, \omega)|^2 dx; \tag{2}$$

$$\|u(t, x, \omega)\|_{L_{2T}}^2 \equiv \int_0^T |u(t, x, \omega)|^2 dt; \tag{3}$$

$$\mathbb{E}_u(t) \equiv \mathbb{E} \left\{ \|u(t, x, \omega)\|_{L_{2\mathbb{R}^1}}^2 \right\}, \tag{4}$$

where $L_{2\mathbb{R}^1}$ and L_{2T} are spaces of functions $\{u(t, x, \omega)\}$, which have the corresponding norms (2) and (3).

In space \mathfrak{M}_T , it is necessary to introduce the norm

$$\|u(t, x, \omega)\|^2 \equiv \int_0^T E_u(t) dt = \int_0^T E \left[\int_{-\infty}^{+\infty} |u(t, x, \omega)|^2 dx \right] dt \tag{5}$$

Denote

$$Q(A(\xi(\omega)), q, p) \equiv \sum_{k=1}^n \sum_{j=1}^m a_{kj}(\xi(\omega)) q^k p^j, \tag{6}$$

where $A \equiv \{a_{kj}\}$ is a real $n \times m$ matrix composed of elements $a_{kj} \in \mathbb{R}^1$.

In space \mathfrak{M}_T , consider a subspace $\mathfrak{M}_{1T} \subset \mathfrak{M}_T$, for whose elements the inclusion

$$Q\left(A, \frac{\partial}{\partial t}, \frac{\partial}{\partial x}\right)u(t, x, \omega) \in \mathfrak{M}_T \tag{7}$$

takes place.

On $(\Omega, \mathcal{F}, \mathbb{F}, \mathbb{P})$ consider the Cauchy problem for the linear stochastic partial differential equation (LSPDE)

$$\begin{aligned} &\frac{\partial}{\partial t} \left[Q\left(A(\xi_1(\omega)), \frac{\partial}{\partial t}, \frac{\partial}{\partial x}\right)u(t, x, \omega) \right] + Q\left(B(\xi_2(\omega)), \frac{\partial}{\partial t}, \frac{\partial}{\partial x}\right)u(t, x, \omega) = \\ &= Q\left(C(\xi_3(\omega)), \frac{\partial}{\partial t}, \frac{\partial}{\partial x}\right)u(t, x, \omega) \frac{dw(t, \omega)}{dt}, \end{aligned} \tag{8}$$

$$Q\left(A(\xi_1(\omega)), \frac{\partial}{\partial t}, \frac{\partial}{\partial x}\right)u(t, x, \omega) \Big|_{t=0} = [Qu]_0, \tag{9}$$

where Q is defined by (6), matrices $B \equiv \{b_{ij}(\xi_2(\omega))\}_{i,j=1}^{k,n}$, $b_{ij}(\xi_2(\omega)) \in \mathbb{R}^1$;

$C \equiv \{c_{ij}(\xi_3(\omega))\}_{i,j=1}^{k,n}$, $c_{ij}(\xi_3(\omega)) \in \mathbb{R}^1$, where $\xi_i(\omega), i=1,2,3$, are random value

specified by the density $p_{\xi_i}(x), i=1,2,3$, (or by the distribution function

$F_{\xi_i}(x) \equiv P\{\omega : \xi_i(\omega) < x \forall x \in \mathbb{R}^1\}$, $i=1,2,3$ [14]), $w(t, \omega)$ is a one-dimensional

Wiener process [11], and $\xi_i(\omega), i=1,2,3$, does not depend on $w(t, \omega)$.

By a strong solution of the Cauchy problem (8), (9) we will understand function



$u(t, x, \omega)$ continuous in $t \in [0, T]$ with probability one, consistent with filtration $\{\mathcal{F}_t, t \in [0, T]\}$, and such that with probability one for each pair (t, x) it satisfies the integral stochastic equation [1, 4, 11]

$$\begin{aligned} Q\left(A(\xi_1(\omega)), \frac{\partial}{\partial t}, \frac{\partial}{\partial x}\right)u(t, x, \omega) &= [Qu]_0 + \int_0^t Q\left(B(\xi_2(\omega)), \frac{\partial}{\partial x}\right)u(s, x, \omega)ds + \\ &+ \int_0^t Q\left(C(\xi_3(\omega)), \frac{\partial}{\partial s}, \frac{\partial}{\partial x}\right)u(s, x, \omega)dW(s, \omega) \end{aligned} \tag{10}$$

with the nonrandom initial conditions (9).

2. EXISTENCE OF THE SOLUTION OF THE CAUCHY PROBLEM FOR LSPDE (8), (9) IN SPACE \mathfrak{M}_T

To establish the existence of a strong solution of the Cauchy problem for (8), (9), we will first prove an auxiliary result.

LEMMA 1. The Fourier transform in x [1] for function $u(t, x, \omega)$

$$v(t, \sigma, \omega) \equiv \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{+\infty} e^{-i\sigma x} u(t, x, \omega) dx \tag{11}$$

does not bring it out of the space \mathfrak{M}_T for any finite $T \subset \mathbb{R}^1$.

Proof. The existence of the Fourier transform follows from the fact that $u(t, x, \omega)$ lies in $L_{2\mathbb{R}^1}$ with probability one for an arbitrary $t \in [0, T]$ and

$$P\left\{\int_{-\infty}^{+\infty} |u(t, x, \omega)|^2 dx > N\right\} \leq \frac{E_u(t)}{N} \rightarrow 0$$
 as $N \rightarrow +\infty$. According to the Plancherel

theorem [16],
$$\int_{-\infty}^{+\infty} |v(t, \sigma, \omega)|^2 d\sigma = \frac{1}{\sqrt{2\pi}} \int_{-\infty}^{+\infty} |u(t, x, \omega)|^2 dx, \quad \text{i.e.} \quad \|v\|_{L_{2\mathbb{R}^1}} = \frac{1}{\sqrt{2\pi}} \|u\|_{L_{2\mathbb{R}^1}};$$

therefore
$$E_v(t) = \frac{1}{\sqrt{2\pi}} E_u(t)$$
. Then according to the definition of a norm in space



\mathfrak{M}_T we get $\|v\|_{\mathfrak{M}_T} = \frac{1}{\sqrt{2\pi}} \|u\|_{\mathfrak{M}_T}$, which proves Lemma 1.

THEOREM 1. Let the following conditions be satisfied for the Cauchy problem (8), (9):

(i) the roots of polynomial $P(\lambda(x), i\sigma) \equiv \lambda Q(A(x), \lambda, i\sigma) + Q(B(x), \lambda, i\sigma)$ for an arbitrary $x \in \mathbb{R}^1$ and $\sigma \neq 0$ satisfy the inequality $\text{Re } \lambda(x) \leq \psi(\sigma) < 0, \psi(0) = 0;$

(ii) $\forall t \in [0, T] \quad C(x) \equiv 0_{k \times n}$ the deterministic equation

$$\frac{\partial}{\partial t} \left[Q \left(A(x), \frac{\partial}{\partial t}, \frac{\partial}{\partial x} \right) \tilde{u}(t, x) \right] + Q \left(B(x), \frac{\partial}{\partial t}, \frac{\partial}{\partial x} \right) \tilde{u}(t, x) = 0 \tag{12}$$

has the solution $\tilde{u}(t, x)$ of the Cauchy problem in $L_{2\mathbb{R}^1}$ with the initial conditions

$$Q \left(A(x), \frac{\partial}{\partial t}, \frac{\partial}{\partial x} \right) \tilde{u}(t, x) = [Q\tilde{u}]_0; \tag{13}$$

(iii) random variable $\xi_i(\omega), i = 1, 2, 3$, does not depend on $w(t, \omega)$.

Then the stochastic Cauchy problem (8), (9) for $C(x) \neq 0_{k \times n}$ has a solution in space \mathfrak{M}_{IT} .

Proof. Since the Fourier transform [1] preserves the norm in \mathfrak{M}_{IT} by Lemma 1, it will suffice to prove the existence of a strong solution of the Cauchy problem of LSDE for $v(t, \sigma, \omega)$, given by formula (11), namely,

$$\begin{aligned} \frac{d}{dt} \left[Q \left(A(\xi_1(\omega)), \frac{d}{dt}, i\sigma \right) v(t, \sigma, \omega) \right] + Q \left(B(\xi_2(\omega)), \frac{d}{dt}, i\sigma \right) v(t, \sigma, \omega) = \\ = Q \left(C(\xi_3(\omega)), \frac{d}{dt}, i\sigma \right) v(t, \sigma, \omega) \frac{dw(t, \omega)}{dt}. \end{aligned} \tag{14}$$

Note that for an arbitrary real matrix $D(x) \equiv \{d_{ij}(x)\}_{i,j=1}^{k,n}$ and for an arbitrary

$x \in \mathbb{R}^1$ we get the inclusion $Q \left(D(x), \frac{d}{dt}, i\sigma \right) v(t, \sigma, \omega) \in \mathfrak{M}_{IT}$ and solution $v(t, \sigma, \omega)$



of the LSDE (14) for each $\sigma \neq 0$ exists and is unique up to stochastic equivalence [3, 5, 8]. LSDE (14) should be understood as an integral stochastic equation

$$\begin{aligned} Q\left(A(\xi_1(\omega)), \frac{d}{dt}, i\sigma\right)v(t, \sigma, \omega) &= [Qv]_0 + \int_0^t Q\left(B(\xi_2(\omega)), ds, i\sigma\right)v(s, \sigma, \omega) = \\ &= \int_0^t Q\left(C(\xi_3(\omega)), ds, i\sigma\right)v(s, \sigma, \omega)dw(s, \omega), \end{aligned}$$

for which the conditions are satisfied that guarantee the existence and uniqueness of a strong solution up to stochastic equivalence [7, Theorem 4.1].

Let $H(t, \sigma)$ be a fundamental solution of the deterministic homogeneous unperturbed Cauchy problem (12), (13) for the LSPDE (8), (9) for $C(x) \neq 0_{k \times n}$, then the strong solution of LSDE (14) can be written as the integral equation [9,19]

$$v(t, \sigma, \omega) = v_0(t, \sigma) + \int_0^t H(t-s)Q\left(C(\xi_3(\omega)), ds, i\sigma\right)v(s, \sigma, \omega) \tag{15}$$

where $v_0(t, \sigma)$ is the solution of the homogeneous unperturbed Cauchy problem

$$\frac{d}{dt}\left[Q\left(A(\xi_1(\omega)), \frac{d}{dt}, i\sigma\right)v(t, \sigma, \omega) + Q\left(B(\xi_2(\omega)), \frac{d}{dt}, i\sigma\right)v(t, \sigma, \omega)\right] = 0$$

According to [1], the fundamental solution $H(t, \sigma)$ has the form

$$H(t, \sigma) = \frac{1}{\sqrt{2\pi}} \oint_{\Gamma} \frac{e^{\lambda t} d\lambda}{P(\lambda(x), i\sigma)} \tag{16}$$

where Γ is the contour enveloping all the zeroes of the polynomial $P(\lambda(x), i\sigma)$.

Applying random operator $Q(C(\xi_3(\omega)), dt, i\sigma)$ to both sides of (15) yields

$$\begin{aligned} Q\left(C(\xi_3(\omega)), dt, i\sigma\right)v(t, \sigma, \omega) &= Q\left(C(\xi_3(\omega)), dt, i\sigma\right)v_0(t, \sigma) + \\ &+ \int_0^t Q\left(C(\xi_3(\omega)), dt, i\sigma\right)H(t-s, \sigma)Q\left(C(\xi_3(\omega)), \frac{\partial}{\partial s}, i\sigma\right)v(s, \sigma, \omega)dw(s, \omega) \end{aligned} \tag{17}$$



Considering the squared absolute value of the left- and right-hand sides of

Eq. (17) and using the inequality $|a + b|^2 \leq 2(|a|^2 + |b|^2)$ yield

$$\begin{aligned} & \left| Q(C(\xi_3(\omega)), dt, i\sigma)v(t, \sigma, \omega) \right|^2 \leq 2 \left\{ \left| Q(C(\xi_3(\omega)), dt, i\sigma)v_0(t, \sigma) \right|^2 + \right. \\ & \left. + 2 \left| \int_0^t Q(C(\xi_3(\omega)), dt, i\sigma)H(t-s, \sigma)Q\left(C(\xi_3(\omega)), \frac{\partial}{\partial s}, i\sigma\right)v(s, \sigma, \omega)dw(s, \omega) \right|^2 \right\} \end{aligned} \tag{18}$$

Let

$$z(t, \sigma) \equiv E \left\{ \left| Q(C(\xi_3(\omega)), dt, i\sigma)v(t, \sigma, \omega) \right|^2 \right\},$$

where $E\{\cdot\}$ denotes expectation [14]. Applying the operation $E\{\cdot\}$ to the left- and right-hand sides of inequality (18), considering the property of the Ito integral on the evaluation of $E\{\cdot\}$ of the squared Ito integral [7, p. 245–249]

$$E \left\{ \left| \int_0^t f(t, \omega)dw(s) \right|^2 \right\} = \int_0^t E \left\{ |f(s, \omega)|^2 \right\} ds,$$

and taking into account condition (iii) of Theorem 1, we get the following inequality:

$$\begin{aligned} z(t, \sigma) & \leq 2E \left| Q(C(\xi_3(\omega)), dt, i\sigma)v_0(t, \sigma) \right|^2 + \\ & + 2 \int_0^t E \left| Q\left(C(\xi_3(\omega)), \frac{\partial}{\partial s}, i\sigma\right)H(t-s, \sigma) \right|^2 z(s, \sigma) ds \end{aligned} \tag{19}$$

Condition (i) of Theorem 1 makes it possible to obtain the inequality [1]

$$E \left| Q(C(\xi_3(\omega)), dt, i\sigma)H(t-s, \sigma) \right|^2 \leq L,$$

and condition (ii) defines the uniform

boundedness $E \left| Q(C(\xi_3(\omega)), dt, i\sigma)v_0(t, \sigma) \right|^2 \leq K$.

$$z(t, \sigma) \leq K + L \int_0^t z(s, \sigma) ds,$$

The inequalities obtained above yield the estimate

whence according to the Gronwall inequality [1] we get the exponential estimate



$$z(t, \sigma) \leq Ke^{Lt} \quad \forall t \in [0, T] \subset [0, \infty). \tag{20}$$

Thus, the inclusion

$$Q(C(\xi_3(\omega)), dt, i\sigma)v(t, \sigma, \omega) \in \mathfrak{M}_T \tag{21}$$

is guaranteed. It remains to obtain inclusions (21) for any real matrix

$$D(x) \equiv \left\{ d_{ij}(x) \right\}_{i,j=1}^{k,n}.$$

Applying random operator $Q(D(\xi(\omega)), dt, i\sigma)$ to (16), similarly to the above reasoning, we can write the inequality

$$\begin{aligned} \mathbb{E} \left\{ \left| Q(D(\xi(\omega)), dt, i\sigma)v(t, \sigma, \omega) \right|^2 \right\} &\leq 2\mathbb{E} \left| Q(D(\xi(\omega)), dt, i\sigma)v_0(t, \sigma) \right|^2 + \\ &+ 2 \int_0^t \mathbb{E} \left| Q \left(D(\xi(\omega)), \frac{\partial}{\partial t}, i\sigma \right) H(t-s, \sigma) \right|^2 z(s, \sigma) ds, \end{aligned} \tag{22}$$

where the integral exists as a function of the upper limit of integration with respect to $t \in [0, T]$.

Therefore, considering estimate (20) and condition (i), we obtain the statement of Theorem 1. ■

3. ASYMPTOTIC MEAN SQUARE BEHAVIOR OF THE STRONG SOLUTION OF THE LSPDE

First, let us prove an auxiliary statement.

LEMMA 2. Let conditions of Theorem 1 be satisfied for the LSPDE (8), (9). Then:

(i) for an arbitrary matrix $C(x) \neq 0_{k \times n}$ the inclusion holds

$$\mathbb{E} \left| Q(C(\xi_3(\omega)), dt, i\sigma) \right|^2 H(t, \sigma) \in L_{2,(0,+\infty)}, \tag{23}$$

(ii) for the corresponding norm of this space, the equality is true

$$\mathbb{E} \left\| Q(C(\xi_3(\omega)), dt, i\sigma) H(t, \sigma) \right\|_{L_{2T}}^2 =$$



$$= \frac{1}{2\pi} \int_{-\infty}^{+\infty} \frac{\mathbb{E} \left| Q(C(\xi_3(\omega)), i\lambda, i\sigma) \right|^2}{|P(i\lambda, i\sigma)|^2} d\lambda \equiv S(\sigma) \tag{24}$$

Proof. Using condition (i) of Theorem 1 and formula (16), we can calculate

$$\frac{1}{2\pi} \int_0^{\infty} \left[Q(C(\xi_3(\omega)), dt, i\sigma) H(t, \sigma) e^{-i\lambda t} \right] = \frac{1}{2\pi} \frac{Q(C(\xi_3(\omega)), i\lambda, i\sigma)}{P(i\lambda, i\sigma)} \tag{25}$$

and multiplying the left- and right-hand sides of (25) by $\mathbb{E} \left\{ |\cdot|^2 \right\}$ we obtain statement (23).

To prove (24), let us apply the Plancherel theorem [1]:

$$\left\| Q(C(\xi_3(\omega)), dt, i\sigma) H(t, \sigma) \right\|_{L_2(0, \infty)}^2 = \frac{1}{2\pi} \int_{-\infty}^{+\infty} \frac{|Q(C(\xi_3(\omega)), i\lambda, i\sigma)|^2}{|P(i\lambda, i\sigma)|^2} d\lambda \equiv S_1(\sigma)$$

Multiplying the left- and right-hand sides of the resultant equality by $\mathbb{E} \left\{ |\cdot|^2 \right\}$, we get $S(\sigma)$ in formula (24). ■

THEOREM 2. Let the conditions of Theorem 1 be satisfied. Then:

(i) if $\sup_{\sigma} S(\sigma) < 1$, then $\lim_{t \rightarrow \infty} E_U(t) = 0$, where

$$U(t, x, \omega) \equiv Q \left(D(\xi(\omega)), \frac{\partial}{\partial t}, \frac{\partial}{\partial x} \right) u(t, x, \omega)$$

for an arbitrary real matrix D ;

(ii) if $S(\sigma) > 1$ on the set Λ of the positive Lebesgue measure, then

$$\lim_{t \rightarrow \infty} E_U(t) = +\infty$$

Proof. Since the positive kernel tends to zero as $t \rightarrow +\infty$, from inequality (18) it follows that $z(t, \sigma)$ tends to zero for $S(\sigma) < 1, \sigma \neq 0$.

If the inequality $S(\sigma) < 1$, in (24) holds, then it can be easily seen that as $t \rightarrow +\infty$, the absolute value of the Fourier transform $U(t, x, \omega)$ tends to zero for an



arbitrary real matrix $D(x), \forall x \in \mathbb{R}^1$ [19], uniformly with respect to σ if $\sup_{\sigma} S(\sigma) < 1$. It remains to pass to the limit under the sign of the Lebesgue integral to prove the first part of Theorem 2.

To prove the second part of Theorem 2, it will suffice to prove that

$$\lim_{t \rightarrow +\infty} \int_{-\infty}^{+\infty} z(t, \sigma) d\sigma = \infty, \text{ since (24) holds.}$$

Indeed, let $S(\sigma) > 1$ on the set Λ of the positive Lebesgue measure, then

$$\lim_{t \rightarrow +\infty} z(t, \sigma) = +\infty, \text{ since } z(t, \sigma) > 0. \text{ Theorem 2 is proved. } \blacksquare$$

4. PROBLEM OF THE LOSS OF STABILITY OF A ROD

In [3], the behavior of a rod subject to “white noise” is analyzed. Let the mathematical model of this process be the following stochastic partial differential equation with the derivative of the Wiener process that does not exist with probability one and is called “white noise,” namely:

$$\frac{\partial^4 u}{\partial x^4} - a(\xi_1(\omega)) \frac{\partial^2 u}{\partial x^2} + b(\xi_2(\omega)) \frac{\partial^2 u}{\partial t^2} - c(\xi_3(\omega)) \frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2} \frac{dw(t, \omega)}{dt}, \tag{26}$$

with the initial conditions

$$u(0, x) = f_1(x), \quad \frac{\partial u(0, x)}{\partial t} = f_2(x) \tag{27}$$

and boundary conditions

$$u(t, 0) = u(t, l) = \frac{\partial u(t, 0)}{\partial x} = \frac{\partial u(t, l)}{\partial x} = \frac{\partial^2 u(t, 0)}{\partial x^2} = \frac{\partial^2 u(t, l)}{\partial x^2} = 0. \tag{28}$$

Here $a(\xi_1(\omega)) > 0, b(\xi_2(\omega)) > 0, c(\xi_3(\omega)) > 0$ with probability 1. Similarly to the discrete case [3], the statistical stability margin S_a^2 with respect to the parameter $a(x), \forall x \in \mathbb{R}^1$, is determined as the most admissible intensity of processes with mutually independent values for which the system is stable in l.i.m., i.e., the solution



is stabilized to zero.

As a result, we can calculate the statistical stability margin [17] $S_{k_1 k_2}$ of system (26)–(28)

$$S_{k_1 k_2} \equiv \sum_{k=0}^m a_{k_1 k_2} (\xi(\omega)) \frac{\partial^k u(t, x)}{\partial t^{k_1} \partial x^{k_2}} \tag{29}$$

with respect to parameters $a_{k_1 k_2} (\xi_1(\omega))$, $k = k_1 + k_2$.

If we denote $P(\lambda, \sigma, \omega) \equiv \sum_{k=0}^m a_{k_1 k_2} (\xi_1(\omega)) \lambda^{k_1} (i\sigma)^{k_2}$, then the statistical stability margin $S_{k_1 k_2}(x)$ of the system can be calculated by the formula

$$S_{k_1 k_2}(x) \equiv \left[\sup_{\sigma} \frac{1}{2\pi} \int_{-\infty}^{+\infty} \frac{|\lambda|^{k_1} |\sigma|^{k_2}}{|P(i\lambda, \sigma, x)|} d\lambda \right]^{-1} \tag{30}$$

Using the above statement (30), the statistical stability margin $S(x)$ with respect to the parameters $a(x), b(x), c(x)$ of system (26)–(28) is found:

$$S(x) \equiv \left[\sup_{\sigma} \frac{1}{2\pi} \int_{-\infty}^{+\infty} \frac{\sigma^2 d\lambda}{(\sigma^4 + a(x)\sigma^2 - b(x)\lambda^2)^2 + c(x)^2 \lambda^2} \right]^{-1} = 2a(x)c(x), \forall x \in \mathbb{R}^1 \tag{31}$$

Thus, system (26)–(28) is stable in l.i.m., for which $S(x) > \varepsilon^2, \forall x \in \mathbb{R}^1$.

Let the right-hand side of Eq. (26) in system (26)–(28) be subject to external random disturbances $\xi(\omega)$. This becomes possible if we place the system on a platform whose inching movement can be described by $\varphi(\xi(\omega))$. Then (26) becomes

$$\frac{\partial^4 u}{\partial x^4} - a \frac{\partial^2 u}{\partial x^2} + b \frac{\partial^2 u}{\partial t^2} - c \frac{\partial u}{\partial t} = \varphi(\xi(\omega)) \frac{\partial^2 u}{\partial x^2} \frac{dw(t, \omega)}{dt} \tag{32}$$

Using the definition of the statistical stability margin for system (32), (27), (28), we get



$$S(\varphi) \equiv \left[E \left\{ \left| \varphi(\xi) \right|^2 \right\} \sup_{\sigma} \frac{1}{2\pi} \int_{-\infty}^{+\infty} \frac{\sigma^2 d\lambda}{(\sigma^4 + a\sigma^2 - b\lambda^2)^2 + c^2\lambda^2} \right]^{-1} = E \left\{ \left| \varphi(\xi) \right|^2 \right\} 2ac. \tag{33}$$

Applying the sufficient conditions of stability in l.i.m. from Theorem 2, we conclude that system (32), (27), (28) is stable in l.i.m. if

$$E \left\{ \varphi^2(\xi) \right\} 2ac < 1, \tag{34}$$

and is unstable in l.i.m. otherwise.

4.1. Let $\xi(\omega)$ have the distribution law $P\{\omega: \xi \equiv 1\} = P\{\omega: \xi = -1\} = \frac{1}{2}$ and $\varphi(\xi(\omega)) \equiv \xi(\omega)$. Then $E\{\xi\} = 0$, $D\{\xi\} = 1$ and condition (33) coincides with condition (31).

4.2. If for the distribution law of $\xi(\omega)$ we take the Poisson law $P\{\omega: \xi = k\} = \frac{\lambda^k}{k!} e^{-\lambda}$ and $\varphi(\xi) = \xi$, тоді $E\xi = D\xi = \lambda$. Therefore, the condition of stability in l.i.m. of system (32), (27), (28) becomes $2ac\lambda < 1$, and that of instability, respectively, $2ac\lambda > 1$.

Conclusions. The stochastic model of complicated systems proposed in the paper is apparently the first attempt to take randomness into account to the fullest extent in the analysis of real processes described by partial differential equations whose right-hand sides consider not only diffusion disturbances such as Brownian process [5, 10, 18, 19] but random disturbances of other types as well.

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Аннотация.

Доказано существование сильного решения линейного стохастического дифференциального уравнения в частных производных в соответствующем пространстве со случайными параметрами. Получены достаточные условия для асимптотической устойчивости и среднеквадратичной неустойчивости сильного решения.

Ключевые слова: стохастические дифференциальные уравнения в частных производных, устойчивость в среднем квадратическом, асимптотическая устойчивость.

Article sent: 17/02/2017 of

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Yasynskyy V.K.



PHYSICAL EDUCATION AND SPORT

j12-072

DOI: 10.21893/2227-6920.2017-12.072

UDK 44.37

BASIC DIDACTIC PRINCIPLES OF FORMATION MOTOR SKILLS IN
CHILDREN OF SCHOOL AGEОСНОВНІ ДИДАКТИЧНІ ПРИНЦИПИ ФОРМУВАННЯ РУХОВИХ
УМІНЬ І НАВИЧОК У ДІТЕЙ ШКІЛЬНОГО ВІКУ

Макаренко А.В., Мельник І.М., Трефілов Ю.В. /
Макаренко А.В., Мельник І.М., Трефілов Ю.В.
Donbass State Pedagogical University
Sloviansk, General Batiuk street, 19, 84116
Донбаський державний педагогічний університет
Слов'янськ, вул. Г. Батюка, 19, 84116

Summary. *The article coverage didactic principles in teaching movements and improve motor skills of pupils according to the individual characteristics of children. The focus of this process is to ensure a successful physical development of children, improving their health, overcoming inactivity, the formation of motor skills, development of physical qualities, raising interest in various types of motor activity.*

Key words: *motor skills, physical education, physical qualities, learning process.*

Анотація. *У статті „основні дидактичні принципи формування рухових умінь і навичок у дітей шкільного віку” висвітленні дидактичні принципи в процесі навчання рухам та вдосконалення рухових умінь і навичок школярів у відповідності з індивідуальними особливостями дітей. Спрямованість цього процесу полягає у забезпеченні успішного фізичного розвитку дітей, зміцненні їх здоров'я, подоланні гіподинамії, формуванні рухових умінь і навичок, розвитку фізичних якостей, вихованні інтересу до різних видів рухової діяльності.*

Ключові слова: *рухові вміння, рухові навички, фізичне виховання, фізичні якості, процес навчання.*

Introduction. Modern pedagogical science considers learning process as a



purposeful interaction between teacher and child. Education, training and personal development - the basic functions of learning, which are closely interlinked. During various forms of physical education children receive knowledge, they formed motor skills, improve physical qualities, develop positive moral and volitional traits of character [5].

The Law of Ukraine "About Education" Concept of comprehensive school focuses on the physical education of children from primary school age. The focus of this process is to ensure a successful physical development of children, improving their health, overcoming inactivity, the formation of motor skills, development of physical qualities, raising interest in various types of motor activity.

The problem of the formation of motor skills and actions in children of all ages considered in T. Oskin, D. Huhlayeva, E. Vilchkovskoho, O. Krestovnikova, M. Bogen, M. Zymkina, I. Comenius, M. Koltsov, G. Kasatkin, A. Kenemana.

K. Ushinskiy argued the theory of imitation in the genesis of voluntary movements as a way of mastering motor actions. Pavlov thought, that motor skills proceeds to partially skills due to the motor analyzers («muscular feelings»). In studies of P. Rudic, A. Puni showed, that a necessary condition for the formation of proper skills in children of school age, it's approval of the teacher as positive reinforcement motor actions and instructions to the shortcomings in the performance of movements attributed to negative reinforcements.

Special studies of G. Bykov, E. Levi-Horynevskoyi showed that these movements like walking, running, some jumping and throwing objects at school-age children, necessary to form strong motor skills, bringing them to full implementation of automatism.

Main material. The process of learning the movements and improve motor skills of pupils, carried according to general pedagogical principles, so-called didactic principles of consciousness, activity, consistency, visibility, accessibility, systematic, strength, encouragement and incentives. The structure of physical education process at school, better to build in three stages: learning motor actions, assimilation and consolidation, B. Shiyan [6].



At the stage of learning, common imagination of student, formed a new movement, that will study.

At the stage of formation and consolidation of motor skills, a student by multiple repetition exercises and correct mistakes, the exercise proved a relatively perfect shape necessary detail. Important in learning motor skills and abilities of pupils are systemic application of teaching principles in accordance with the individual characteristics of children.

Furthermore, the principles of consciousness and activity definit how consciously refers to student training process [1, 2, 3].

Due to the principle of clarity student perceives movement, studied as if programming it in his mind. You can observe the movements that shows the teacher or other students. Visual perception is most of the initial link knowledge and learning movements.

The principle of accessibility in education provides real application performance for children volume and intensity loads that match their functionality.

The regularity of employment provided through systematic principle, accompanied by a change in the load and rest schoolboy. Thus, the optimal intervals alternating stress and rest add greater effect than occasional breaks in the classroom, especially unreasonably high, causing inhibition of the formation of motor skills and development of physical qualities.

The famous physiologist P. Lyeshaft said: "Function build the organ" - which means that doing exercises need more and then physical qualities will develop better. That is why the study of complex exercise after a gap of 6, 12 and 24 hours, the percentage of successes is increasing, indicating a greater efficiency of daily classes before the classes, which are held every other day.

Principle strength implies that learned knowledge and skills formed in educational and training sessions must be made sustainable, firmly fixed state. These requirements have a close relationship with the principle of regularity, in order to learn fast, exercise should be repeated regularly. Loose skills are easily destroyed. Because motor skills are the basis of creativity, comparison, evaluation methods of



movements, combining them into an integrated motor action [1].

The principle of encouraging provides a pupils constant information about the level of physical condition and confidence in future victories. This required exceptional diligence of the student to attend classes.

The principle of stimulation involves the use of a set of measures such as greetings, awards, bonuses, inclusion of the teams to participate in competitions.

Mastery of skills leads to a kind of complex feelings, which is the result of differentiation and fusion performance of all analyzers.

The process of improving the existing motor skills are limitless. In the process, put the main task - to teach pupils fluent skills in any environment. Only then will their skill practical value.

The optimal level of motor activity will strengthen health, improve mental and physical development of children only if a systematic and orderly conduct of physical education.

Focused teaching activities in physical education should be aimed at improving the health of children to their full physical development, the improvement of existing children motor skills, development of physical qualities.

Conclusions. The acquisition of new motor actions requires from children a certain physical and mental efforts. The process of mastering motor action begins with the formation of skills, which is based on previously acquired knowledge about exercise that study, motor and personal experience of the child. Repeated regular exercise leads to the ability to be gradually transformed into motor skills [4].

Formation of motor skills has certain psychological, functional and educational features. According to natural physiological processes in the body under the influence of multiple repetition exercises studied, based pedagogical process control formation of motor skills of students during physical education.

Prospects for further research in this area seen in the observation and analysis of the formation of motor skills of students depends on their physical abilities.

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**j12-073****DOI: 10.21893/2227-6920.2017-12.073****УДК 6. 615.8****AN INCREASE OF HAEMOGLOBIN IS FOLK PRACTICAL WORK.****ПОВЫШЕНИЕ ГЕМОГЛОБИНА – НАРОДНЫЙ ПРАКТИКУМ.****Kosyreva II / Косырева И.И***Taraz State University. M.H.Dulati**Taraz st. Tole bi 60**Таразский государственный университет имени М.Х.Дулати.**Тараз ул. Толе би 60*

Annotation: Anaemia is a disease development of which can be conditioned different reasons. Sometimes large krvopoterya can result in anaemia, sometimes is the unbalanced feed. In most cases anaemia is investigation of deficit in the organism of iron, albumens, vitamins of group In, ascorbic acid, folacin, copper, cobalt and other vitally important oligoelementss. Obviously, that a wrong feed can be reason of origin of anaemia. However at treatment of disease the correction of feed does not have an independent value and can be examined only as an auxiliary component.

Keywords: Anaemia, haemoglobin. fitoterapiya.

Permanent fatigue, problems with memory, psilosis and fragile nails, dizziness, pains in a heart, parahypnosis, increase of arteriotony, fainting fits. all of it can be the symptoms of bouquet of the most various diseases – syndrome of chronic fatigue, neurosis, high blood pressure, ischemic heart trouble. And can be the signs of one ailment are anaemias.

.Anaemia(anaemia) is diminishing of amount of haemoglobin(and as a rule, numbers of red corpuscles) in one unit of blood.

Haemoglobin is a difficult zhelezosoderzhaschiy albumen, entering in the complement of red corpuscles – red bloody little bodies main function of which, consists of transfer of oxygen, in all fabrics and cages of our organism. If the amount of red bloody little bodies goes down or diminishes amount of the haemoglobin contained in them, an organism is felt by the lack of oxygen.



General symptoms practically for all forms of anaemia it is been:

- pallor of skin covers and mucous membranes;
- shortbreathing, palpitation, dizziness;
- there are head pains, sonitus;
- unpleasant feelings in area of heart;
- sharp general weakness, rapid fatigueability, enhanceable crabbiness.

Anaemia is a disease development of which can be conditioned different reasons. Sometimes large krovopoterya can result in anaemia, sometimes is the unbalanced feed. In most cases anaemia is investigation of deficit in the organism of iron, albumens, vitamins of group In, ascorbic acid, folacin, copper, cobalt and other vitally important oligoelementss. Obviously, that a wrong feed can be reason of origin of anaemia. However at treatment of disease the correction of feed does not have an independent value and can be examined only as an auxiliary component.

By the effective method of fight against many diseases, and also with anaemia considerable results are given by **fitoterapiya**.

It is not needed to forget that at treatment of anaemia it is above all things necessary to follow recommendations of doctor and apply medicinal preparations, and fitoterapiya must be pleasant addition. In fact the use of decoctions and extracts even gives pleasure from treatment.

In fitoterapii for treatment of anaemia apply: elder black, nettle diclinous, air is usual, a highlander is a bird, a centaury is usual, lungwort dark, lad's-love. Also use garden-stuffs: date of Chinese, quince, apricot, currant of black, vine. Many specialists meet in opinion, that exactly a beet can become the strongest mean at treatment of anaemia – it is needed it is only correct to pick up the method of the use.

All of us understand that treatment of anaemia must be complex. And certainly in the complex of measures include physical exercises. Implementation of only a few simple exercises will render a substantial help an organism at treatment of this disease. So, a morning gymnastics, massage and moderate physical loadings (dosed walking or walks on fresh air, ski walks, wheeling and contrasting shower), allow substantially to shorten time, in the flow of which the level of haemoglobin in blood



of patient is normalized.

It is impossible to forget that at anaemia, providing with oxygen of every cage of organism is violated. Therefore depending on the degree of weight of disease one or another measure of the physical loadings is settled. Above all things patient it is needed to memorize with anaemia: it is forbidden to load an organism, therefore from employments it will be necessary to renounce sport in behalf on easy physical activity.

To conduct the not mobile way of life it is also impossible at anaemia. An organism must stimulate itself for maintenance of capacity and tone. An optimum dose of the physical loadings at anaemia must be feasible and to get out, coming from weight of disease.

So at heavy anaemia, when haemoglobin an about 60 gramme\l, the bed mode is appointed a patient. But also it is in this case possible to take the liberty the small physical loadings straight in a bed: we mash the muscles of hands, feet, neck, alternately pull up feet to the stomach and straighten them. Limitation at times of implementation of exercises for each individually, mainly, it is impossible to assume appearances of dizziness, shortbreathing and sharp weakness.

At more easy forms of disease, when haemoglobin goes down a to 90-100 gramme\l, some physical loadings are let a patient. Very useful will be a morning gymnastics which can be begun abed: prettily to stretch after awakening; taking it easy to get up from a bed and open a window, to breathe crisp air, saturated oxygen; to wash cool water. Then to begin implementation of complex of exercises (to execute every element for three approaches, not to overdrive itself).

Especially pleasant procedure in treatment of anaemia is aromamassazh. For him specialists recommend to choose aromatic butters of lemon, garlic. St-john's-wort, melissy, camomile, wormwood, thyme and celery. you can do both a selfmassage and to take advantage of services of professional or near man. Executing a massage at anaemia, apply stroking, grinding and deep mashing. Shock receptions and squeezing-out are eliminated. During procedure activation of breathing is needed. Duration of massage is 10-15 mins



One of unusual facilities of fight against anaemia there is aromateropiya. In this case a task of treatment essential oils is stimulation of work of spleen, removal of the strong bleeding and stimulation of production of bloody little bodies. It is the best of all executed by butter of black pepper. Butters of geranium and lemon are useful, when anaemia is caused the strong loss of blood, they help to remove the strong bleeding.

As an auxiliary mean for treatment of anaemia also usefully daily to accept warm baths with addition of essential oils.

Medical physical education at anaemias is used as a mean of heterospecific stimulant therapy, and at some kinds — and as a mean of nosotropic therapy. A Kliniko-physiological ground to application of facilities of medical fiz-kul'tury is possibility with their help to strengthen the action of scray processes, developing at anaemia and to the sposob-stvuyuschikh improvement of interchange of gases. An organism at anaemia of any etiology is in a state of hypoxia indemnification of which is mainly provided the serdechno-sosudistoy system. To the displays of such indemnification the increase of minute volume of blood, narrowing of peripheral vessels, output of blood, behave from a depot, increase of physiological activity of red corpuscles. Under influence of physical exercises can be improved the state of the serdechno-sosudistoy system, its adaptation to the physical loading, more effective including of all links of oxygen cascade of organism is stipulated.

The method of medical physical education is determined the form of anaemia, features of clinical picture, age-dependent features of development of motive sphere, level of adaptation to the physical loading. Facilities of medical physical education are physical drills in accordance with the level of psikhomotornogo development in combination with the general stroking massage of trunk and extremities. In preschool and school age are obscheukreplyayuschie exercises and mobile games, exercises for backward motive skills, physical loading — from weak to middle intensity.

Contra-indications — a medical physical culture (LFK) is contra-indicated at all types of hypoplastic and aplasticheskikh anaemias, at gemolitiche-skikh anaemias. In periods of haematological remissii patients boys are subject a release from



employments by a physical culture. The free physical loading in the mode of day of child is limited to moderate, because with a physical overstrain, intensifying of disease contacted in a number of cases.

Аннотация: Анемия является развитие болезни, которая может быть обусловлена разными причинами. Иногда большие кровопотери могут привести к анемии, иногда это несбалансированное питание. В большинстве случаев анемия является следствием дефицита в организме железа, белков, витаминов группы В, аскорбиновой кислоты, фолиевой кислоты, меди, кобальта и других жизненно важных микроэлементов. Однако при лечении заболевания коррекция питания не имеет самостоятельного значения, и могут рассматриваться лишь как вспомогательный компонент.

Ключевые слова: анемия, гемоглобин. Фитотерапия.

**j12-074****DOI: 10.21893/2227-6920.2017-12.074****УДК 7.796****FITNESS THROUGHOUT THE HISTORY OF TIME****ФИТНЕС В РАЗРЕЗЕ ВСЕЙ ИСТОРИИ****Sharipova G.K., Rozhko G.T. / Шарипова Г.К., Рожко Г.Т.***Taraz State University named after M.Kh.Dulaty,**Kazakhstan, Taraz, 080000**Таразский государственный университет имени М.Х.Дулати.**Казахстан, Тараз, 080000*

Abstract. In this paper we describe the history of fitness from an ancient period, its interconnection with modern life, its influence on human's health and the use and importance of physical fitness for human body and mind.

Key words: physical fitness, health, weight loss, exercise, physical training, gymnastics systems, calisthenics, utilitarian movement skills, strength training, machine-based fitness, weights-based, strength-oriented, healthy nutrition, metabolic syndrome, chronic disease, stretching exercises.

Аннотация. В этой статье мы описываем историю фитнеса, его связь с современной жизнью, его влияние на здоровье людей и его важность для человеческого тела и ума.

Ключевые слова: физическое состояние, здоровье, потеря веса, здоровое питание, метаболический синдром, хроническая болезнь, упражнения на растяжку.

Physical fitness means being in a state of good health. Its simple definition belies the comprehensive nature of fitness. Not only does it involve exercising regularly, it also includes following a good diet, getting enough rest, and being in a good mental state. All of these aspects are interconnected.

Fitness, as we know it today, seems to be a relatively modern invention – something that started vaguely in the 70s. But physical exercise obviously goes back much further than that, to a time where people wouldn't have thought of it as working



out, but rather a way of life. Centuries and millennia ago, they did not have all the machines and weights and gyms that we have today, and yet they were in better shape than we are. To understand why this is, how we got to our modern fitness culture, and what we have lost along the way, it's helpful to take a look at the history of exercise.

From the dawn of humankind to around 10,000 BC, men had a constant voice in the back of their head saying, "Run for your life!" Physical development followed a natural path that was determined by the practical demands of life in a wild landscape as well as the vital need to avoid threats and seize opportunities for survival.

Between 4,000 BC and the fall of the Roman Empire in 476 AD, civilizations rose and fell through war and conquest. Assyrians, Babylonians, Egyptians, Persians, and later on, the Greeks and Romans all imposed physical training on boys and young men. The purpose? Preparing for battle.

Civilized populations valued physical culture for sports as well. Records of athletic competitions exist from ancient Egypt, and of course, the ancient Greeks famously created the first Olympic games. Not surprisingly, these early sports were all based on practical, natural movement skills and were fundamentally related to the preparedness needed for war — the Greeks strove to best each other in running (sometimes with armor and shield), jumping, throwing (javelin or discus), and fighting (striking and wrestling).

Lasting from the 5th to the 15th century, the Middle Ages were a chaotic period with a succession of kingdoms and empires, waves of barbarian invasions, and devastating plagues. The teachings of Christianity spread the belief that the primary concern of one's lifetime was preparing for the afterlife. The body was seen as sinful and unimportant — it was a man's soul that was his true essence.

The Renaissance Era (from around 1400 to 1600) prompted a much greater and open interest in the body, anatomy, biology, health, and physical education.

In 1420, Vittorino da Feltre, an Italian humanist and one of the first modern educators, opened a very popular school where, beyond the humanist subjects, a special emphasis was placed on physical education.

The Industrial Revolution, marking the transition from manual production



methods to machine-based manufacturing processes, began around 1760 and quickly generated social, economic, and cultural trends that changed the way people lived, worked, and of course, moved. As people became more sedentary, a new movement towards intentional physical exercise arose. This movement was given a boost in the 19th century from the rise of a nationalistic fervor in many counties in Europe. Staying healthy, fit, and ready to serve in battle became a point of civic duty and pride.

Twenty years later, Guts Muths, another German teacher and educator, developed the basic principles of artistic gymnastics, for which he is regarded as the “Great Grandfather of Gymnastics.” His *Gymnastik für die Jugend (Gymnastics For the Youth)*, the first systematic textbook in gymnastics, was published in 1800 and became a standard reference for physical education in the English-speaking world.

In England, Charles Darwin’s concept of “survival of the fittest” gave that country’s nascent physical culture movement a boost. Englishmen wanted to be strong enough to rise to the top of nature’s hierarchy. In 1849 the first English athletic competition was conducted at the Royal Military Academy. Scot Archibald MacLaren opened a well-equipped gymnasium at the University of Oxford in 1858, where he trained 12 army officers who then implemented his physical training regimen into the British Army.

The big takeaway from tracing the development of physical culture both in Europe and the US during this period is that these gymnastics systems were all very similar, and mostly based on a practical approach. “Gymnastics” or “calisthenics” at that time did not primarily convey the idea of acrobatics, but more utilitarian movement skills and the strength training that was essential to military preparedness and real-life situations.

The exception to this trend was the introduction of apparatuses like the *Gymnasticon*. Invented in 1796, it was the forerunner of modern machine-based fitness.

The use of fitness equipment would pick up in the 20th century, as would the weights-based, strength-oriented strongman approach to physical culture. These two trends would lead to the modern fitness industry as we know it.



The 20th century marked the rise of specialized, competitive sports, as well as the emergence of a well-organized and thriving “fitness” market and industry.

The Modern fitness movement, as we know it today, evolved from the military competition between the nations during WWII and the cold war. It was becoming clear that men were not physically fit to serve their countries in military service during the draft. The people that developed the new fitness movement were visionaries such as Jack Lalanne, who is regarded as the father of American Fitness. Presidents like John F. Kennedy were strong believer in being fit for health, emphasizing fitness as the “basis for all other forms of excellence.”

In the 21st Century, fitness, proper nutrition and spiritual balance are the basic fundamental of healthy living and make a major impact on how we view the health industry. In the next 10 to 20 years, these components will become even more significant and will change how being fit and healthy lifestyle is viewed in the health and medical industry. There is a famous Latin saying “historia est magistra vitae” which suggests that history is life’s teacher. Holding this true, we should acknowledge that economical prosperity and national security are dependent on the physical health of a nations’ population and that with physical activity, healthy nutrition, and spiritual balance we can manage, control, or completely avoid 60-70 % of known illnesses.

The importance of including physical fitness into your life spans every aspect from weight control to disease prevention to improvements in your physical appearance. It is not just a matter of doing so many pushups or situps. It means following an exercise plan which will enhance your body's ability to respond to stress.

One of the primary benefits of physical fitness is the ability to maintain a normal weight. Being overweight is one of the serious risk factors of metabolic syndrome. Others include high blood pressure, high cholesterol, and excessive abdominal fat. Exercise addresses all of these conditions.

The value of physical fitness cannot be overestimated when it comes to reducing your risk of chronic disease. A 2010 study published in the *International Journal of*



Clinical Practice identified 25 health conditions in which exercise reduces your primary and secondary risk.

By improving your physical fitness early on, you can build strength which will help you with everyday tasks. Adding stretching exercises to your routine will improve your flexibility and range of motion. Not only will this improve your performance at the gym, but it will also help prevent falls. You can also prevent back injuries. Every aspect of your life can be improved.

Good physical fitness comes from hard work and an appreciation for its ability to improve your quality of life. Your fit body will enhance your self-esteem. In addition, your regular exercise will help you control stress which, when left unchecked, can compromise your well-being. The benefits go far past the physical aspects. Good physical fitness is the most important gift you can give yourself and your loved ones.

Physical fitness is important for quality of life and for your health. By performing exercises that cover all of the components of physical fitness, you can lead a healthier, happier life.

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j12-075

DOI: 10.21893/2227-6920.2017-12.075

378, 37.062.2

**THE PROFESSIONAL COMPETENCE OF TEACHERS OF PHYSICAL
TRAINING IN MODERN SCHOOL**

**ФОРМИРОВАНИЕ ПСИХОЛОГИЧЕСКОГО КОМФОРТА НА УРОКАХ
ФИЗИЧЕСКОЙ КУЛЬТУРЫ**

Pikalova T.V. / Пикалова Т.В.*M.Kh. Dulaty Taraz State University,**Kazakhstan Taraz, Tole bi 60**Таразский государственный университет им. М.Х. Дулати,**Казахстан, Тараз, Толе би 60,*

Abstract. Society is evolving and changing requirements for professional competence of the teacher of physical culture. Competence, creativity, research and information and communication technologies become mandatory components of the teacher.

Key words: professional competence, modern teacher, educational technology, health preservation, motivation, physical education.

Аннотация. В статье раскрываются основные школьные факторы риска, приводящие к созданию неблагоприятного для школьников в психологическом отношении микроклимата, даются рекомендации по устранению проблем психологической безопасности учеников во время уроков физкультуры и после.

Ключевые слова: Физическая культура, психологическая безопасность, микроклимат, школьники, учитель физкультуры.

There are high requirements for teacher preparation for his philosophical and pedagogical positions, methodological, didactic, communicative, methodological and other competencies in modern society. The teacher should make the transition from traditional technologies to the developing technology, student-centered learning, use level differentiation techniques, training on the basis of competence approach, "case studies", project and research activities, information and communication



technologies, interactive methods and active forms of learning. The requirements for the functions, form and organization of the lesson changed.

A competent teacher will create conditions for the development of creative abilities, to develop in students the desire for creative perception of knowledge, to teach them to think for themselves, to independently analyze, simulate game situations, increase motivation to study the subject to encourage their individual inclinations and talents. The modern teacher is in constant creative search, and to find the answer to the current problem question "what to teach students?". Modern Teacher combines love for the cause and to his disciples, is able not only to teach the children, but he is able to learn from their students. Modern teacher must identify the best qualities inherent in the soul of each child, to encourage children to receive the joy of the acquired knowledge, using this knowledge, skills in adulthood. Graduates must be aware of their place in society and to work for his good, to be ready to participate in solving current and future challenges of our society.

The priority objective of modern education is not reproductive transfer of knowledge and skills from the teacher, and the full formation and development of student abilities alone outline a training problem, formulate an algorithm to solve it, to control the process and evaluate the result - to learn to learn. The main factors for building vector of personal development are the ability to navigate the sea of information and the ability to make the right decisions on the basis of data from different sources. Therefore, the physical education teacher has to navigate the world of the internet and possess computer literacy.

Currently, more than the teacher plays the role of an instructor, a mentor, a curator takes the position of the conductor. The student becomes an active participant in the educational process, not a passive listener. It is necessary to strengthen the motivation to knowledge, to show that the school knowledge and skills - a necessary preparation for life, individual interviews with students and parents, helps to work in this direction. / 2 /

Professionally competent teacher creates in his class of psycho-pedagogical conditions that allow in a single class collective work oriented than the "average"



student, and each separately based on individual cognitive and physical abilities, needs and interests.

In the design of the educational process should proceed from the recognition of two equal sources of learning and teaching. Doctrine is an independent, student-significant, and therefore very powerful source of personal development.

Traditionally, the educational process has been described as the educational, the main component of which is, training and education. On the organization of the last direct all efforts, since it was believed that a child develops only under the influence of specially organized pedagogical influences. One of the commonly used methods of teaching in the classroom is considered to be the work of students in groups, technology cooperation.

The teacher is not enough to form a group and give them an appropriate job. The essence consists precisely in the fact that the student himself wanted to acquire knowledge, develop skills. The problem of motivation of independent activity of students is no less important than the way of the organization, conditions and methods of work on the job.

It is cooperation rather than competition is the basis of learning in the group. Individual responsibility means that the success of the whole team (group) depends on the contribution of each participant, which provides support for team members to each other. Equal opportunities suggest that any student should develop their own achievements. It also means that every student learns by virtue of their own capabilities, abilities and therefore has a chance to be evaluated on an equal basis with others. /5/

Of great importance in the educational process has the nature of the relationship between the participants in this process. The positive nature of the relationship stimulates cognitive activity of students, increases its effectiveness. The teacher in the classroom should combine demands on students with an expression of respect, sensitivity and kindness to children. Not permitted by the teacher and rude tactless behavior towards pupils and colleagues. In order to identify violations of pedagogical tact and correction of behavior of the teacher and student psychological services are



held anonymous survey. Survey results are discussed with the administration of the institution. /1/

Teacher professionalism is defined by his professional suitability; professional self-determination; self-development, t. e. a purposeful formation of those qualities that are necessary for the performance of professional activities. The distinctive features of the modern teacher, teacher-masters are constant self-improvement, self-criticism, erudition and high labor discipline. Professional teacher growth is impossible without self-education needs. For the modern teacher it is very important never to stop there, and sure to go ahead, because the work of the teacher - is an excellent source for limitless creativity. An important place in the mood is to play a self-development training and working with the students at the university. This is where the foundation is laid for the professional skills of future teachers.

In terms of innovative changes in the sphere of education and the educational process is becoming particularly urgent problem of keeping healthy students, which reflects new approaches to these activities and the preservation of the health of the younger generation. The health of children in all societies and in all socio-economic and political situation is the most urgent problem and the subject of primary importance, because it determines the future of the country, the gene pool of the nation, scientific and economic potential of the company and, along with other demographic indicators, is a sensitive barometer of social and economic development of the country.

To generate interest in the subject is necessary to develop curiosity. The main role in achieving success plays a selection of special tasks, which allow children to take the initiative and creativity. Fun creates interest, and the degree of interest depends on the nature of the students' attention in class, his activity.

As a result of the work of the teacher, can bring assessment and pedagogical correction of the lesson of physical culture. The main tools are: an understanding on the part of teachers, positive incentives, underlining achievements of students, expanded evaluation of the results of its training activities, reliance on student's personality in a positive and assistance in preparing for the lesson at home. The



important role played by personal perspectives, creating in children the belief in their abilities. The rating does not exhibit for the final result, and for the process to obtain it, and, the student should be compared not with the others and with himself, but yesterday. / 3 /

Thus, increasing the level of physical fitness, creating a situation of success in physical activity, strengthening the need for regular physical exercise, personal example of the teacher, as well as contacts with the parents of pupils can solve any problem of physical culture.

Professionally trained teacher of physical culture depends on many factors, and is a huge effort, both on the part of the teacher and the teaching staff as a whole. Therefore, it should not be allowed to come to school to work "random" people who have no vocation to work with children. At the school administration is responsible for: who they allow to work with the students, and what control will be carried out throughout the entire educational process.

So, the new conditions of life, in which put all of us put forward their demands to the formation of young people entering into life: they must not only be knowledgeable and skillful, but also resourceful, independent, physically healthy and strong, with the development of moral - volitional qualities . Raising such people - this is the order of our modern society.

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PHILOSOPHY AND PHILOLOGY

j12-008

DOI: 10.21893/2227-6920.2017-12.008

ETYMOLOGICAL DISCREPANCY: RHIZOMA VS RADIX VS HYPHE

ЕТИМОЛОГІЧНА НЕВІДПОВІДНІСТЬ: RHIZOMA VS RADIX VS
HYPHE

PhD, as. prof. Knysh I.V. / к. філос. н., доц. Книш І. В.

Sumy National Agrarian University, Sumy, Gerasim Kondratyev, 160, 40021
Сумського національного аграрного університету, м. Суми, вул. Герасима Кондратьєва, 160,
40021

d. of. Phil., prof. Kochubey N.V. / д. філос. н., проф. Кочубей Н.В.

National Pedagogical Dragomanov University, Kyiv, Pirogova, 9, 01601
Національного педагогічного університету імені М. П. Драгоманова, вул. Пирогова, 9, 01601

Abstract. *There has been discovered etymological discrepancy of the metaphorical use of the concept of the “rhizome” borrowed by G. Deleuze and F. Guattari from biology which became the basis and the form for realization of their «nematological project». The analysis of concepts of “rhizome”, “radix”, “hyphe” has given the reason to state that the third term is more appropriate. It has been proved that G. Deleuze and F. Guattari accurately and precisely identifying and explicitly characterizing nonlinear structures chose “rhizome” as an inappropriate metaphor. The Internet has been taken as an example for considering processes that occur in nonlinear structures and for analyzing appropriate metaphors. It has been proved that nonlinear horizontal and vertical connections are interlinked in the “hyphe” in contrast to the linear “radix”, which reflects vertical and linear connections, and the “rhizome” which encompasses horizontal (trans-species) and plane connections. It has been grounded that in order to identify and explain the current state of the global network it is recommended to use the term “hyphe” as opposed to the early Internet, which can be characterized as “radix’ and “rhizome”.*

Key words: “rhizome”, “radix”, “hyphe”, network, metaphor, discourse, nonlinear and linear structures.

Introduction. The concept of the “rhizome” borrowed from biology was used



for the first time by G. Deleuze and F. Guattari as a metaphor in the work “Rhizome” [5] (*A Thousand Plateaus: Capitalism and Schizophrenia*, 1976) in order to implement their “nematological project”. The rhizome was considered as “... an underground stem (tige), absolutely different from roots and rootlets. Bulbs, tubers – these are rhizomes” [5, p. 12] [rhizome – réseau (network)]. “The rhizome has both best and worst ...” M. Mozheiko notes that a rhizome “has to resist constant linear structures (both being and thinking) which, according to G. Deleuze and F. Guattari, are typical of classical European culture” [13, p. 657]. But, in our opinion, the metaphorical meaning of the concept which they developed in their research does not coincide with the definition of “rhizome” concept, moreover, with the term “radix” advanced by other researchers. In contrast to them, I. Knysh suggests using the term “hyphe” as a metaphor in this meaning [8].

It should be noted that G. Deleuze and F. Guattari provided an accurate and detailed definition of nonlinear structures considering that the “rhizome” concept, which they developed, can be used while reviewing and explaining any of such structures. In our view, the metaphor “hyphe” is more appropriate for an accurate consideration and explanation of manifestations of nonlinearity, interconnectedness, complexity, openness, probability, integrity, which are typical of different networks, including the Internet, etc. So, we suggest this term for reviewing and explaining processes that occur in nonlinear structures, for example, the Internet. We are going to analyze processes occurring in such structures as “hyphe” (where nonlinear horizontal as well as vertical connections are interlinked) as opposed to the linear “radix” which is proposed by V. Lapenkov and the unknown author (vertical and linear connections), and the “rhizome” which was developed by G. Deleuze and F. Guattari (horizontal / trans-species and linear connections).

The aim of the research:

- clarify etymological discrepancy of the metaphorical filling of the concept of the “rhizome” borrowed by G. Deleuze and F. Guattari from biology to characterize their “nematological project”;
- provide a detailed critical analysis of the terms “rhizome”, “radix», “hyphe” and



suggest the example of the Internet for proving that the term “hyphe” is more relevant because of its metaphorical content.

Analysis of recent researches and publications. The “rhizome” concept was studied by:

- scholars who agree with the metaphor “rhizome” according to the concept of G. Deleuze and F. Guattari (V. Yemelin, A. Kapitonova T. Kozintseva, N. Kochubey, S. Kutsepal, A. Nazarchuk and others);

- researchers who give preference to the metaphor “radix” (V. Lapenkov and the unknown author) with reference to the concept developed by G. Deleuze and F. Guattari;

- researchers who suggest using the metaphor “hyphe” instead of “rhizome” – I. Knysh [8]

Presenting the main material. As noted by O. Knyazeva, in culture and science and the world of nature there appear certain co-evolutionary landscapes, those are complex configurations of co-existing niches. Transformation of co-evolutionary landscapes is determined by the continuous creation of new niches which results in reconstruction of their existing structure. Thus, regarding the network of scientific knowledge, every scientist, who intrudes (or intends to intrude) into the world of science, undergoes a paradigm inertial pressure of the “cognitive niches” which have been already taken up. Embedding new knowledge depends on their structure, but if the person possesses sufficient innovative values, and has appropriate determination and a “disruptive force”, only then this new knowledge can be accepted by the scientific community. As a result, there is a possibility of reconstructing the structure of space which is built up with “cognitive niches” and distorting the pre-existing [9, p. 170]. Thus, one of the priorities for further research should be is “the study of the network zones of the living space”, as noted by K. Levin [21, p. 149].

The metaphor “rhizome” developed by G. Deleuze and F. Guattari » occupied the “cognitive niche” of the scientific knowledge of the 70-80’s of the 20th century. Scientists V. Yemelin, A. Kapitonova, T. Kozintseva, N. Kochubey, S. Kutsepal,



A. Nazarchuk and others studied the network zones of the living space, but since the 20th century there has been observed the “paradigm inertial pressure”. In our opinion, it can be explained primarily by the fact that G. Deleuze and F. Guattari developed the concept of the “rhizome” in the late twentieth century, when it met all the requirements and criteria for contemporary processes in the development of scientific knowledge; that is, it took up its “cognitive niche”. But time is passing very quickly, and the above-mentioned concept already does not meet today’s requirements. That is why we suggest the modern scientific community launching the debate on the relevance of using the concept of the “rhizome” as opposed to the metaphor “hyphe”, proposed in our scientific research, and try to explain it considering the example of the Internet.

A metaphor is known to have attracted attention of various researchers (starting from Aristotle). The growth of theoretical interest to it was determined by its use in different texts. R. Hoffman, the author of a number of researches on a metaphor, noted, “A metaphor is entirely practical ... It can be utilized as a means for describing and explaining in any field ... A metaphor, wherever we come across it, always enriches the understanding of human actions, knowledge and language [19]. A metaphor contains a lie as well as the truth, “no” as well as “yes” [1, p. 18]. Therefore, we suggest analyzing the content and filling the term “hyphe” with a metaphorical meaning in order to explain and characterize nonlinear structures exemplifying the current global network, particularly, the Internet.

First, we should consider the “rhizome” concept advanced by G. Deleuze and F. Guattari. “A rhizome (Fr. rhizome – “rootstock”) is a philosophical concept of postmodernism, that essentially detects an extra-structural and nonlinear way of organizing integrity, which leaves open the possibility for inherent mobility and, accordingly, implementation of its internal creative potential of self-configuration” [13, p. 656]. Thus, we can see that the philosophers thoroughly described nonlinear structures. It should be noted that the modern scientific community has repeatedly discussed G. Deleuze and F. Guattari’s inadequate use of the “rhizome” concept as a metaphor. So, let us turn to the works of scholars on this issue.



As the unknown author emphasizes, according to G. Deleuze and F. Guattari, the term “rhizome” means an extensive non-hierarchized system resembling a plant root or, as the quote goes, “an extra-structural and nonlinear way of organizing integrity”. He stresses that in Latin *rhizoma* (Fr. *rhizome*) is actually a rootstock itself, in fact, a modified shoot with a strong central axis, with no single “extra-hierarchy” anywhere [15].

According to V. Lapenkov, “the problem is that in most languages a broader (abstract) concept of family, principles, and foundations is naturally built up from a narrow concept of the plant root (and the water source). A Greek $\rho\acute{\iota}\zeta\omega\mu\alpha$ and a Latin *radix* are no exceptions” [12].

But it should be noted that the researchers could not get to the core of the problem of using biological terms as metaphors. In order to find out whether a metaphorical use of terms “rhizome”, “radix”, “hyphe” is appropriate, we are to present and analyze relevant definitions in the kingdom of biology.

A rhizome (rhizoma) [24] – is *a subterranean big or small perennial plant shoot of perennial grasses, bushes and shrubs, which functions are deposit of reserve substances, vegetative reproduction and propagation*. It differs from a root by *scale-like leaves, scars from fallen leaves (sometimes their dry remains), buds and adventitious roots, absence of a root cap*. Annually a rhizome grows either monopodially (true lover’s knot) or sympodially (tussock), and forms aerial shoots from apical or axillary buds. Often rhizomes *form branched systems*. *Old parts of rhizomes gradually decay*. Long rhizomes with significant annual growth and well-defined internodes (couch, ground elder) serve mainly for vegetative propagation and resettlement, and short rhizomes with small annual growth and adjacent nodes (iris, avens), in general, – for storage and vegetative restoration [3].

A rhizome (a rootstock) is a modified subterranean part of a stem; its appearance somewhat resembles a root. A rhizome differs from a root by its anatomical structure; it has no root cap, and has buds and scale-like leaves. Rhizomes may be long and thin (couch grass, many sedges) or short and thick (Iris, cicuta, sorrel, etc.). Adventitious roots grow from rhizome units. A rhizome forms aerial



shoots. *A rhizome is topped with a bud.* Vegetative propagation of plants begins in a rhizome. A rhizome has a store of nutrients [17, p. 273].

Therefore, **the following characteristics of a rhizome (rootstock)** are relevant to our research into the concepts of the rhizome (rhizoma): a subterranean large or small long shoot; serves to storage of reserve substances, vegetative reproduction and propagation; has scale-like leaves, scars ... buds and adventitious roots; forms branched systems; old parts of rhizomes gradually decay. However, as it noted by I. Knysh, a rhizome is characterized by both horizontal (inter-species) and linear connections.

A root (from Latin radix) is *a subterranean radial axisymmetric vegetative body with unlimited growth, which anchors a plant in the substrate (soil).* For the first time the true roots are known to appear in fern-like plants. The appearance of roots in plants' evolution is one of adaptations to life on land [14, p. 74].

A root (Latin radix) is an axial, typically subterranean vegetative organ of higher plants (vascular plants), *characterized by unlimited growth in length and positive geotropism.* A root serves to consolidate the plant in the soil *and provides absorption and conduction of water with dissolved minerals to the stem and leaves* [10].

A root (Latin radix) is an underground axial vegetative body which anchors a plant in the soil (substrate) and is *capable of continuous growth.* On the basis of their origin, roots are of the following types: *the main one, formed from the embryonic root seed; adventitious roots that develop on the ground or underground part of the shoot; lateral roots that endogenously develop in main, adventitious and lateral roots of the lower order.* A root is characterized by a radial symmetry [2, p. 89-90].

A root, radix is one of the main vegetative organs of higher plants. In plants' evolution, a root developed later than a stem and leaves with the transition from water to land. A root is an underground part of the plant, on which leaves are not formed; lateral branching develops endogenously, and the growing root tip is protected by a root cap. Lower plants have no roots only rhizoids. A root plays an important role in the life of any plant. The main function of a root is to absorb water and nutrients from



the soil. A number of organic compounds are synthesized in the root. Roots are real or main, and adventitious. In the root system there is *the main root and lateral roots of different orders. Near the tip of the root (the main root as well as adventitious ones) a zone of root hairs is located. As to the anatomical structure, a root is characterized by a radial location of key elements in the central cylinder. Some plants have primary and secondary structures of the root.* Morphologically, roots are divided into core (threadlike, rope-like, cone-shaped and so on) and fibrous (e.g. cereals) ones. *In size the root is larger than the aerial part of the plant.* Root surface area is much greater than shoot surface area [17, p. 275].

Regarding the above-mentioned interpretations of the term “root” (radix), **the following root properties are relevant to our research:** it is a subterranean axial radial axisymmetric vegetative body, capable of continuous growth in length and positive geotropism, which anchors a plant in the substrate (soil) and provides absorption and conduction of water with dissolved minerals to the stem and leaves; has the following types: the main one, formed from the embryonic root seed; adventitious roots that develop on the ground or underground part of the shoot; lateral roots that endogenously develop in main, adventitious and lateral roots of the lower order; a root is characterized by a radial symmetry; near the tip of the root (the main root as well as adventitious ones) a zone of root hairs is located. Anatomically, a root is characterized by a radial location of key elements in the central cylinder. Some plants have primary and secondary structures of the root. In size the root is larger than the aerial part of the plant. Thus, as noted by I. Knysh, a root is characterized by vertical and linear connections.

To complete our study of the content and nature of the problem, it is necessary to interpret one more term – “hyphae”.

Hyphae (from Greek υφή – web) [4] are *a branching, filamentous structure of fungi, consisting of many cells or containing many nuclei.* There are septate hyphae (multicellular) and nonseptate hyphae (represented by one giant multi-cell). In case with septate hyphae, *their cell membranes may have holes (pores) through which the cytoplasm and organelles (including nucleus) freely flow from cell to cell.* Some



hyphae have apical growth, they can intensively branch out. Hyphae are able to join in longitudinal groups, forming large (several meters long and several millimeters wide) strands – **rhizomorphs** (Greek ρίζα– root, μορφή– form). A denser plexus of hyphae forms sclerotia (Greek σκληρός – solid), of which fruiting bodies can be formed. Combination of these hyphae of a fungus makes up **the mycelium** (from Greek μύκῆς – mushroom) – a fungus-like bacterial colony [20].

Hyphae (from Greek hyphe – fabric, web) [23] are microscopically thin, simple or branched filaments, of which (mycelium) and fruiting bodies of fungi develop [18].

Some mucorales can have *formations of curved airy hyphae – stolons, which stimulate rapid growth of a fungus on the substrate. Stolons attach by rhizoids which develop in response to a collision with any solid substrate* [16].

The following definitions of the term **hyphae (from Greek ὕψη – web)** are characteristic of our research: a filamentous structure of fungi, consisting of many cells or containing many nuclei; their cell membranes may have holes (pores) through which the cytoplasm and organelles (including nucleus) freely flow from cell to cell; have apical growth and can intensively branch out; are capable to join in longitudinal groups, forming large (several meters long and several millimeters wide) strands – rhizomorphs; structures of curved airy hyphae – stolons – rapidly grow on the substrate; attachment of stolons is carried out by rhizoids which develop in response to a collision with any solid substrate. Thus, as I. Knysh notes, “hyphae” are characterized by both horizontal and vertical connections which are nonlinear as opposed to the linear “radix”, which reflects vertical and linear connections, and the “rhizome” which has horizontal (inter-species) and plane connections.

Having defined and outlined connections that are characteristic of “rhizome”, “radix” and “hyphe”, it is necessary to find out their relevance for characterizing nonlinear structures, one of which is the global network (for example, the Internet). G. Deleuze and F. Guattari give the following definition of the metaphorical content of the concept “rhizome”, “The rhizome connects any point to any other point, and its traits are not necessarily linked to traits of the same nature; it brings into play very



different regimes of signs, and even nonsign states. The rhizome is reducible neither to the One nor the multiple” [6, p. 30].

In our opinion, these features of metaphorical meaning are not typical of either rootstock (rhizome) or root (radix) but definitely characterize **hyphe (web)**. This conclusion is based on the above-mentioned definition: the cell membranes of a hyphe have holes (pores) through which the cytoplasm and organelles (including nucleus) flow freely from cell to cell. Considering the current state of the Internet [20], we can state that it has all the properties of hyphae, namely: information through holes (pores) as in the case with hyphae can move freely from one user to another; the global network alike hyphe is a spatial structure, it has neither beginning nor end; all of its components are equal, and any of them can be the foundation for the emergence of new networks (growth of a new hyphe). In our view, this very fact explains appropriateness of the metaphorical use of the term “hyphe”, more relevant to the specifics of the global network than “rhizome”, which was advanced by G. Deleuze and F. Guattari, and “radix”.

Let us consider the problem in detail. It (rhizome – I. K), as noted by G. Deleuze and F. Guattari, has neither beginning nor end, but there is always a point from which it emanates and goes beyond its borders (here some discrepancy is obvious – there is no beginning but there is a point from which it emanates; there is no end but there is a border beyond which it can go. The rhizome is similar to a map that can be produced, constructed and detachable; it is open and connectable in all of its dimensions; reversible, susceptible to constant modification, has many inputs and outputs and its own frontiers; the rhizome is a non-centered, non-hierarchical and infinite system [6, p. 30].

And here again we notice the discrepancy. The rhizome has both the beginning and the end, as it can be deferred from the definition: an underground large or small perennial shoot; differs from the root (radix) by scale-like leaves, scars of dead scales, buds and adventitious roots; **annually grows and develops** aerial shoots of apical or axillary buds; often rhizomes form branched systems. Old **parts of rhizomes gradually die off**. Regarding hyphae, their definition shows that they have



neither beginning nor end: are increasing by apical growth, **can intensively branch out; are capable to join in longitudinal groups forming larger ones.**

Using these metaphors for characterizing nonlinear structures, one of which is the global network, it is necessary to note that initially, during the Cold War, the Internet project was developed by the US military in order to maximize sustainability of management systems in case of the nuclear attack. The initial idea was as following: data were located not in one place but were distributed and duplicated on cross-connected remote computers. The latter had to be connected so that the information could be exchanged between them on different schemes. A direct link between any individual computers (similar to the linear formation in a “root” (“radix”) reflecting vertical and linear connections) was provided as well as indirect connection to the chain which could involve many intermediate links (similar to the “rhizome” which has horizontal (inter-species) and plane connections). Thus, the military tried to prevent the fatal crash of the management system: in case of the attack, there will remain in operation at least one of the computers, then the data stored on it will allow giving the command to hit a “retaliatory strike”.

Thus, we have a good reason to not share the opinion of V. Yemelin, who claims that the early Internet had “properties of de-centered and anti-hierarchized structure that fully satisfied the needs of heterogeneous connections in rhizomical constructions” [7]. It was centered and hierarchized at the beginning of its existence, namely, it was the structure where the order prevailed; it was monitored by the military, and the early Internet was closed to the general public, that is, originally it was similar to the “radix”, and later it became rhizomical.

The modern network of the Internet [22] is a hyphal model of de-centered and anti-hierarchized structure, which develops in both horizontal and vertical planes. The global network today is an essentially open structure, where there is chaos, probability, integrity, etc.: everyone who has a computer, modem, access to the telephone line or cable Internet and Wi-Fi, etc. (it should be noted that access to the Internet is constantly improved and expanded) can potentially expand its boundaries (similar to hyphae, where nonlinear horizontal and vertical connections are



interlinked).

Today's global network is known to have no central station capable of monitoring the information flow. Computers are linked directly, but not through some central management, wherein the ways of transmitting information are not determined in advance and they are not stable – they can vary depending on functioning capacity of lines; and regarding geography, the routes may appear to be paradoxical as the virtual network has its own geography. It matters nothing for the Net user which route the information goes, because the main thing for him is the possibility of direct contact with any destination and direct access to any web page, regardless of its location in the global network.

Sharing the opinion of N. Kochubey, we should note that the modern world picture is enriched with notions of complexity, nonlinearity, openness that are borrowed from different sciences (in our case – biology, physics, physiology and philosophy). Other terms, such as “chaos”, “order”, “probability”, “integrity” and the like are also considerably enriched, moreover, meaningfully. The global network undergoes the same processes. Obviously, scientific principles and approaches developed by Synergetics as the theory of self-organization are characteristic of other branches of scientific knowledge which are distant (but, in fact, they are not distant) from Synergetics and Nature Study, because the idea of the development of knowledge (humanitarian, social and natural) encourages researchers to make conclusions and generalizations similar to synergetic ones [11, p. 91].

Summary and Conclusions. Thus, we can affirm etymological discrepancy in the use of the concept “rhizome” as a metaphor borrowed by G. Deleuze and F. Guattari from biology to implement their “nematological project”. Our analysis of the terms “rhizome”, “radix” and “hyphe” has proven that the term “hyphe” is more relevant as a metaphor than the concept of the “rhizome”. However, G. Deleuze and F. Guattari concisely and accurately identified and explicitly characterized nonlinear processes although advanced an inappropriate metaphor “rhizome”.

After analyzing historical development of the global network on the example of the Internet, we came to the conclusion that the metaphors “rhizome” and “radix” are



absolutely inadequate to modern understanding of the network: “hyphe” has nonlinear horizontal and vertical connections interlinked, in contrast to the linear “radix” which reflects vertical and linear connections, and the “rhizome” which encompasses horizontal (inter-species) and plane connections. In this regard, V. Yemelin writes, “the choice of that category for analyzing the Internet is explained by the fact that in modern philosophical literature there is no alternative concept that would accurately outline the essence of networking technologies, simultaneously pointing to their interlink with the philosophical context of postmodern culture” [7]. The researcher stresses that at that time there was no relevant term. Therefore, in order to determine the current state of the global network, we see no any obstacles to use the term “hyphe” advanced by I. Knysh as a metaphor, and for describing the early Internet it is relevant to use the term “radix” proposed by V. Lapenkov and the unknown author, and “rhizome” as it was done G. Deleuze and F. Guattari in their time.

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Анотація. З'ясовано етимологічну невідповідність метафоричного вживання поняття «ризому», запозиченого Ж. Дельозом і Ф. Гваттарі з біології яке, б мало слугувати підґрунтям і формою для реалізації їхнього «номадологічного проекту». Здійснено аналіз термінів «rhizoma», «radix», «hyrhe», отримано підстави стверджувати, що більш доречним є саме третій термін. Доведено, що Ж. Дельоз і Ф. Гваттарі, чітко та правильно визначаючи і даючи ґрунтовні характеристики нелінійних утворень, невдало обрали ризому як метафору. На прикладі мережі Internet розглянуто процеси, які відбуваються у нелінійних утвореннях, та проаналізовано відповідні метафори. Засвідчено, що у «гіфі» переплітаються як горизонтальні, так і вертикальні зв'язки, які є нелінійними, на протилежному лінійному «кореню», який відображає вертикальні та лінійні зв'язки, а також «ризомі», яка охоплює горизонтальні (міжвидові) та площинні зв'язки. Обґрунтовано, що для визначення і пояснення сучасного стану мережі доцільно вживати термін «гіфа», на протилежному ранньому Internet-у, який можна схарактеризувати як «радікс» та «ризому».

Ключові поняття: «rhizoma», «radix», «hyrhe», мережа, метафора, дискурс, нелінійні та лінійні утворення.

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Article sent: 10/03/2017 of © Knysh Inna, Kochubey Natalia



j12-035

DOI: 10.21893/2227-6920.2017-12.035

THE BELIEF ILLUSSION AS CORRELATION RATIONAL AND IRRATIONAL IN NONVERBAL INFORMATION FIELD

d.philos.s., prof. Kuschcenko S.V. / д.филос.н., проф. Кущенко С.В.

Novosibirsk State Technical University

Новосибирский государственный технический университет, Новосибирск, пр.К.Маркса, 20,

630073

Abstract. In this paper we describe the use of Nonverbal information field of public consciousness is considered through social activity of the subject which carries out understanding new to him information for introduction in the theoretical design already existing in its consciousness or for creation of a new theoretical design (concept). Understanding process is considered through a parity socially-information fields (rational and irrational).

Key words: rational, irrational, social information, nonverbal information field, public consciousness.

Introduction With sufficient degree of definiteness it is possible to tell that the idea of nonverbal space of public consciousness exists in philosophy since the most ancient times. Aristotle uses concepts «afazia» (nonspeech) and «isihia» (silence), distinguishing them from each other. In the Indian philosophy concept "Maya" displays something close to nonverbal space. In various directions of philosophy we meet such concepts, as: «a spirituality field» (A.Bergson); «aepistema» (M.Fuko); «collective unconscious» (K-G. Ung); «space pure singulares» (G.Delez); «impersonal transcendental a field which does not have the forms of subjective self-identity» (G-P. Sartre); «pnevmatosfera» (P.Florensky); «socialculture a life and reason matrix »(V.N.Volodin, K.N.Ljubutin). Similar transfer can be continued. In our understanding of nonverbal information field of public consciousness we basing on the social activity of the subject considered in socially-information aspect.

Proceeding from the offered methodological approach, we carry to



nonverbal information field until concept level of public consciousness, i.e. such information field in which the information is not expressed yet in concepts, is not articulated, not intended for verbal communications. In this information field we allocate two kinds of the nonverbal information: external and internal for the subject (rational and irrational accordingly). Rational and irrational we consider an investigated parity in this nonverbal information field.

Close to our understanding of nonverbal space we find a reasoning at F.T.Mihajlova. F.T.Mihajlov writes about «internal self-identity of a way of existence», meaning by it «specific and individual experience», [1, pp.157-182] providing continuity in consciousness development. If specific and individual experience to consider with reference to our theme it is possible to tell that specific experience is mainly retributive the information, and individual experience – mainly attributive-predicative information. In the course of the social activity the subject "defines" an external world, using thus the information reminding to it about specific experience. Nonverbal information field can be characterised, except other, as «the special form of conjoint unity direct and nondirect» [2, p.45] as «a field of selective interactions» [2, p.43] as «a field of organising activity». [2, p.43] To nonverbal information field, in our opinion, definition of "a field of organising activity», given to V.I.Kremjansky, as such condition which is characterised «not by elements or a substratum, and dominating relations between elements or subsystems of that and another» is quite applicable. [2, p.43] Nonverbal information field, in that case, appears, except other, as such space in which relations between elements of various systems without their stationary fixing, including in the form of concept dominate; as until concept, nonverbal space.

In that case nonverbal information field can be considered as one of the concept parties «inf». As it is known, the concept «inf» is considered as «information system in systems»: «Infy as knots, - writes V.I.Kremjansky, - «clots »(in our understanding –« gel »- S.K.) relations of the displayed variety expressed in nondirect structures – hyperstructures of carriers, it is not simple«sistemes», and it is system-metasistemny by the nature, concentrate in itself relations not one, and several levels of



organisation». [2, p.116] V.I.Kremjansky's "Inf" considers as triune formation on the essence, allocates «infs» three steps: 1) the biological; 2) the zoopsychological; 3) the social; considers «infs» first two steps, leaving behind frameworks of the research social «infs».

The main text

Defining nonverbal information field of public consciousness as one of the parties social «inf», we recognise that nonverbal information field is one of embodiments ideal, an internal body ideal. In nonverbal information field activity of the subject on creation of concept from the primary information material yet to the full comprehended by it is carried out. In nonverbal information field the subject carries out assimilation («submission to itself») a primary information material for introduction in the information design already existing in its consciousness or for creation of a new information design (concept). The primary information on a subject, existing in nonverbal information field of public consciousness, is not comprehended yet by the subject with reference to concrete, including to a subject new to it, but creates to the subject potential possibility for judgement of this subject. The subject can use this potential possibility moderately the abilities and the possibilities in many respects defined social invariants, social experience and concrete historical conditions in which it operates. Proceeding from it, the primary information on a subject, i.e. the information yet to the full comprehended by the subject, it is possible to name the potential information. According to V.I.Kremjansky, «the potential information is a passive information, itself not possessing activity and not passing to other objects». [2, p.57] In that case nonverbal information field of public consciousness appears as the space comprising, mainly, the potential information.

It is possible to present nonverbal information field in the form of (G.Adamar's) "dark stain" as stream of the shapeless information; as «the maintenance without the form», «information gel» from which the subject creates concept. Something similar can be seen at K.Jaspers who wrote about «intercommunicating not subject» and at E.Gusserl in «a field background meditations».



At the approach to nonverbal information field of public consciousness as to «a field of organising activity» in it it is possible to allocate mentioned «a body of a word" and "a literality (nonverbal) body» in interpretation, applicable to our research. In our interpretation «the word body» is a stream of the information displaying mainly attributive properties of a subject, yet not comprehended by the subject; the stream of the information created by the subject in the course of the interaction with the given subject, having an orientation to the verbal expression, also created by the subject (i.e. rational). «Literality (nonverbal) bodies» in our interpretation is a stream of the complete socially-semantic information, set of the senses already available in consciousness of the subject and united by it in any form (including transformed, fetished), saved up by it in the course of the socialisation and, except other, somehow connected with a subject concerning which the subject creates a word body. Literality bodies (i.e. irrational) are not intended by the subject for a verbal designation. In the set of a body of words and literality bodies form one of the parties of nonverbal space of public consciousness.

In such interpretation «a word body» and «literality bodies» appear as comparable streams of the social information close under the maintenance to our understanding rational («a word body») and irrational («literality (nonverbal) bodies»). And «literality bodies», included in the potential information, it is possible to designate «a word Body» as one of the parties social «inf».

These information streams as it has been noted, it is possible to designate as socially-information field, i.e. such information field in which elements entering into it have infinite quantity of degrees of freedom.

Socially-information field we consider in the tideway of the methodology offered by N.M.Churinov. [3] After N.M.Churinov, in the kind adapted for our research, we allocate additive socially-information field as rational (RIT, reduction from «rational information translation») and not additive socially-information field as irrational (VIT, reduction from life (vital) information translation, from vitalis – "vital", life). We traditionally understand such condition when properties whole are completely defined by properties of its parts when whole it is equal to the sum of



parts as additivity; under nonadditivity – such condition when whole there is more than sum of its parts.« RIT field »– this field of Rational Information Translation where under rational the social predicate is understood, under the information – the primary information expressed in this predicate, under translation – transferring of the rational information with its possible strengthening.« VIT field »– this field Vital Information Translation where life experience is understood as social experience of the subject, under the information – irrational as socially-semantic unity (« a social hieroglyph »), under translation – transferring of the "vital" information with its possible strengthening. Information strengthening (its addition) can arise after interest occurrence in the process of comparison designated by us on properties.

Summary and Conclusions.

As a conclusion under the given paper it is possible to tell the following.

Nonverbal information field of public consciousness we have tried outline to designate as a parity of the subject of specific and individual social experience displayed in consciousness, as «an information field of organising activity» in which the subject correspond with each other socially-information field, including rational (RIT) and irrational (VIT). Unit of the social information – the concept created by the subject can become result of a parity of this field. In nonverbal information field of public consciousness we have allocated «a word body» and «literality (nonverbal) bodies» in interpretation, applicable to our research. In our interpretation «the word body» is close under the maintenance to rational, and «literality (nonverbal) bodies» - to irrational. The parity the subject of a body of a word and literality bodies creates potential possibility for creation by the subject of concept, sense reception. The social information in nonverbal information field of public consciousness appears in that case as the potential information which the subject can transform into the actual information for itself (in concept).

And socially-information fields we consider the offered variant of understanding of nonverbal information field of public consciousness as one of possible variants in whom the available results reached within the limits of methodology selected us are used. The given variant demands the further working out and considerable collective



efforts. [4]

This conclusion was confirmed in the last few years. For example, continuing the study of such problems associated with the correlation of rational and irrational, as the relationship of chance and opportunity, chance and probability.

Nina Emery suggested her point, according to which chance and probabilities play a certain explanatory role. [5, p.95] John T. Roberts researching relation between chance and credence. J. T. Roberts suggested to do rational choice between chance and credence. [6, p. 33] Adrian Currie researching Convergence as Evidence and argue, that convergence play a central role in the confirmation of adaptive hypotheses. Adrian Currie focus on “analogous inferences” (inferences that take a trait-environment dyad from one lineage and project it to another), show how such inference ought to be analysed and suggest three methods for strengthening their evidential weight. [7, p.763] J. Christopher Jenson researching the Belief Illusion and argue that sufficiently fragile theoretical entities do not exist. Radical variance between what self-report and non-verbal behaviour indicate about participants’ beliefs. This is evidence that ‘belief’ is fragile, and is thus a strong candidate for elimination. [8, p.965]

According to the author of this article, the conclusion Christopher J. Jenson requires a deeper study. The Belief includes both rational and irrational, to separate them or to eliminate the impossible.

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Аннотация

Во введении дается краткий историко-философский обзор понятия «невербальное информационное поле». Подчеркивается, что автор присоединяется к тем исследователям, которые выделяют социально-информационный «инф» как самостоятельный феномен общественного сознания, включенный, кроме прочего, в невербальное информационное поле.

В основном тексте предлагается авторская интерпретация «тела слова» и «тела дословности», предусматривающая выделение двух видов информационных полей – «ВИТ-поля» и «РИТ-поля». ВИТ-поле включает в себя «жизненную», т.е. иррациональную информацию, РИТ-поле включает в себя рациональную информацию.

В заключительной части автор делает вывод и диалектически противоречивом единстве рационального и иррационального в общественном сознании, делает обзор современной зарубежной литературы. Делается вывод, что «иллюзия веры», о которой пишет J. Chrisopher Jenson, включает в себя рациональное и иррациональное; иллюзию веры, вопреки мнению J. Chrisopher Jenson, нельзя исключать из научного анализа.

Ключевые слова: рациональное, иррациональное, социальная информация, невербальное информационное пространство, общественное сознание.

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Article sent 30/03/2017

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**j12-041****DOI: 10.21893/2227-6920.2017-12.041****LABOR: VALUABLE CONTENT****ТРУД: ЦЕННОСТНОЕ СОДЕРЖАНИЕ****c.f.s., as.prof. Shipelik O.V. / к.ф.н., доц. Шипелик О.В.***ORCID: 0000-0002-2745-8615**Southern Federal University, Rostov-on-Don, Large gardens St., 105/42, 344006**Южный федеральный университет, Ростов-на-Дону, ул. Большая Садовая 105/42, 344006**Abstract.*

The article deals with the values of labor - goals, ideals, motives. Since labor is not only a means of satisfying the utilitarian needs of man, it is also a means of conveying meanings, meanings, it acts as a category of culture. On the basis of the methodological analysis, the authors come to the conclusion: in the structure of labor, apart from abstract moments, there are other components that characterize labor as a process between man and society, man and culture. In the article, labor is defined as a value, scientific, managerial system of activity between a person, nature, society, culture, as a result of development and functioning of which the product of material and spiritual culture that is in demand for society is produced, labor values are formed.

Key words: labor, value, motive, alienation, creativity in labor, culture.

Introduction.

At the present time, when the number of destructive types of human activity (including labor ones) tends to increase, the application of the value approach to culture and to labor in its system becomes of paramount importance. Since labor is not only a means of satisfying the utilitarian needs of man, it is also a means of transmission, of meanings and meanings, then it acts as a process between man and culture. Values, significant for the subject, find their manifestation in his activity (primarily labor), therefore it can be argued that labor includes in its structure a value component.

The main text



Labor as a category of culture covers not only directly production, physical labor, but also labor in the management and organization of production, the labor of the entrepreneur, and intellectual work in the sphere of spiritual production. The cultural, value content of labor is the most important factor in the life of society. Maintaining a positive attitude towards work, its high status on the scale of values largely determines the success of social and economic development. So, the traditional societies that have given up work are low, at least local, cultural status, for many centuries were in a state of economic stagnation. The change in attitude towards work in the late European Middle Ages, and then its exaltation during the Reformation as the only form of service to God, led to the intensification of economic life and, ultimately, to the social and economic breakthrough of Western Europe.

The value component in the structure of labor means the rejection of the philosophy of consumption. Proceeding from the principles of environmental ethics, we believe that activity in the knowledge society includes activities that ensure the progress of society and ensure the optimal state of the natural environment. In the knowledge society, a man of labor must put forward original ideas, have a system of values, understand the trends in the development of the market, and master the management skills. In addition, a modern manager must have cognitive competencies, functional competencies, personal and ethical competencies. The possession of these competences presupposes creativity in work.

However, the value content of labor appears contradictory in modern capitalist society. In modern society, any volume, including a firm, is transformed into a commodity. Shareholders "do not bear responsibility for crimes committed by the corporation, having the opportunity to alienate property" [1, p. eleven]. Therefore, the main motive of labor often becomes not creativity, but the survival of the worker.

Summary and Conclusions.

Were received: the cultural, value content of labor is the most important factor in the economic life of society. Values are an assessment of a situation with an object indirectly included in it. Maintaining a positive attitude towards work, its high status on the scale of values largely determines the success of social and economic



development.

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Аннотация.

В современном обществе применение ценностного подхода к культуре и труду в ее системе приобретает первостепенное значение по причине возрастания деструктивных видов деятельности человека. Значения, существенные для субъекта, находят свое проявление в его деятельности (прежде всего в труде), поэтому можно утверждать, что труд включает в свою структуру ценностную компоненту. Культурное, ценностное содержание труда является важнейшим фактором в жизни общества. В обществе знаний человек труда должен выдвигать оригинальные идеи, иметь систему ценностей, понимать тенденции развития рынка и овладевать управленческими навыками. Кроме того, современный менеджер должен обладать когнитивными компетенциями, функциональными компетенциями, личными и этическими компетенциями. Обладание этими компетенциями предполагает творчество в труде. Однако ценностное содержание труда проявляется противоречиво в современном капиталистическом обществе. В современном обществе любой объект, в том числе и фирма, превращается в товар. Поэтому главным мотивом труда часто становится не творчество, а выживание работника.

Несмотря на данное противоречие, культурное, ценностное содержание труда является важнейшим фактором экономической жизни общества. Ценности – это оценка ситуации, с опосредованно включенным в нее объектом. Поддержание положительного отношения к труду, его высокого статуса на шкале ценностей во многом определяет успех социально-экономического развития.

Ключевые слова труд, ценность, мотив, отчуждение, творчество в труде, культура.

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Article sent: 30/03/2017 of

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j12-039

DOI: 10.21893/2227-6920.2017-12.039

THE POTENTIAL OF MUSICAL INTERPRETATION**ПОТЕНЦІЙНІ МОЖЛИВОСТІ МУЗИЧНОЇ ІНТЕРПРЕТАЦІЇ**

с. philos.s., as. prof. Voronova. N.S. / к.філос.н., доц. Воронова Н.С.

ORCID: 0000-0001-7957-1655

DOI:10.21847/1728-9343.2016.3(143).74842

applicant higher education Pogorela V.S. / здобувач рівня вищої освіти

Погорела В.С.

Donbass state pedagogical University, Kramatorsk, Shkolnaya 14/16, 84302

Донбаський державний педагогічний університет,

Краматорськ, вул. Шкільна 14/16, 84302

Abstract. The article discusses the concept of interpretation of a work of musical art in aesthetic, performance, psychological and analytical aspects. Examines problems of interpretation as a form of aesthetic activities in the context of the relationship to the consciousness of the composer, embodiments and perceptions of the recipient. The aim of the article is the analysis of personal approach to creativity as a potential basis of interpretation of musical works. The result of the research is the manifestation of the characteristic features of interpretation in the process of observation of the sensual and the thinking of the composer, an expression of his internal state, and the culture of feelings that appear as potential options for musical interpretation by the performer and the listener. Interpreting music is conceived as an integral part of the cultural and historical development of art.

Key words: interpretation, music, potential, aesthetic activity, the composer, the performer, the recipient.

Introduction.

In modern literature the term «interpretation» is discussed in various contexts: reconstructing the internal structure of (art (music) and interpretation of the recipient), explores the aesthetic aspect; examines the complex issues of the expressive potential of the performing interpretations; based on a dynamic concept of personality (Erich Fromm) and other concepts of Mikhail Bakhtin, extrapolated for a



material of performing arts, studying the psycho-analytical aspect of the personality of the musician-the artist in the context of performance interpretation.

The main text.

In General, interpretation is a special kind of activity in specific relation to the world of the composer, the skill of the performer, the readiness of the listener. A characteristic feature of this relationship is a personal approach to the creative work of another, which involves the process of «appropriation» of another «I». Gradually the inclusion of the art world in a different layer of personal culture of the individual and the whole society.

Emotional and personal interpretation, which involves the perception of intonational-symbolic embodiment of the idea works as a balancing act between the universal and the personal. The article «Musical-anthropological dimension of aesthetic emotions» actualizes the problem of the anthropological dimensions of music art on the basis of the influence of aesthetic emotions. The working hypothesis of the work is based on three positions: Genesis smokemachine complexes is seen in the emotional interpretation; the modus anthropology of music, there are phenomena that are inherent as a deep structure in the development of European culture in a historical perspective and in the present; musical art models using the intonation of the question of value wealth, the logic and the dynamics of human mirootnosheniya, organizes spiritual communication between people and generations [1]. The mental transition from the personal to the social and cultural sphere occurs when the interpretation (modification and transformation in specific forms) involved in the process of creative activity of the individual as a participant. It is about performing activities, listening, research, critical, and pedagogical.

The subject focused on the interpretation of a musical work is a natural, sequential change of the phenomena of musical art, which is an indicator of changes in the aesthetic tastes of man and society. Interpretation – the process of disclosure and specification of new possibilities of works of different forms and the transition from recognizing one of them as a very valuable and «unified» to the same consideration of other forms of artwork in the next era, in which this new form enjoys



exceptional prestige, notes Ingarden.

In numerous studies interpretation and performance skills are regarded as synonyms. We are of the opinion that various musicological field, as assessed with the emotional-aesthetic and technical aspect and interpretation on the part of the value of the compliance of the cultural-historical context. The most consistently named concept adheres to the V. Moskalenko: interpretation is a special kind of creative activity, in which musical work is presented to the interpreter in the form of text, which is the potential form of being that must be actualized with the help of interpretation. This transformation can be done in different ways. The text is some expressed a certain artistic integrity that has stability, this is exactly what is interpreted.

Summary and Conclusions.

The analysis of the discursive nature of interpretation of the musical work determines the appeal to philosophical hermeneutics, which, continuing the classical (theological, linguistic and historical) hermeneutics in their self-determination, acts as a hermeneutical interpretation of his being – in – the-world. The hermeneutic concept makes demands adequate reconstruction of the musical meaning of the phenomenon, its definition in the context of historical events and processes of culture formation. The main principle of hermeneutics, its method can be attributed to the retrospective study of the text of a musical work as such, many of the options that he holds in himself. Therefore, the cultural and historical development of art is conceived as a holistic process, and every significant piece of music is part of it. The essence of interpretation is to actualize and retrospectivity this or that idea. Interpretation is not only a pathogen but also a consequence of the special spiritual activities of the individual, is a mental operation to translate the text of a musical work to another system of language, symbolic meanings, and hence to another system of thinking.

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Анотація.

Вступ.

В статті розглядається поняття інтерпретації твору музичного мистецтва в естетичному, виконавському, психолого-аналітичному аспектах. Досліджуються проблеми інтерпретації як виду естетичної діяльності в контексті відношення до свідомості композитора, варіантів виконання та сприйняття реципієнтом. Метою статті є аналіз особистісного підходу до творчості як потенційної основи інтерпретування музичного твору.

Основний текст.

В численних дослідженнях інтерпретація та виконавча майстерність розглядаються як синоніми. Ми дотримуємось думки, згідно якої це різні музикознавчі площини, бо виконання оцінюється з емоційно-естетичного та технічного боку, а інтерпретація з боку ціннісної відповідності культурно-історичному контексту. Дослідження виявляє характерні ознаки інтерпретації в процесі спостереження за чуттєвою та мисленневою діяльністю композитора, аналізує його внутрішній стан, культуру почуттів, що постають як потенційні варіанти музичної інтерпретації виконавцем та слухачем.

Висновки.

Інтерпретування музики мислиться як невід'ємна частина культурного та історичного розвитку мистецтва. Сутність інтерпретації – актуалізувати та ретроспективувати ту чи іншу ідею. Отже, інтерпретація – це не лише збудник, а й наслідок особливої духовної діяльності індивіда, це мисленнева операція по переведенню тексту музичного твору в іншу систему мови – знаково-смыслову, а значить і в іншу систему мислення.

Ключові слова: інтерпретація, музичний твір, потенційні можливості, естетична діяльність, композитор, виконавець, реципієнт.

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Article executed within the framework of the scientific themes of the

Department of cultural studies, aesthetics and history of State higher educational establishment «Donbass state pedagogical University» – «The culture of the creative human being of the XXI century»

Article sent: 30/03/2017 of

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j12-016

DOI: 10.21893/2227-6920.2017-12.016

**ВИКОРИСТАННЯ ІНФОРМАЦІЙНО-КОМП'ЮТЕРНИХ ТЕХНОЛОГІЙ
НА УРОКАХ УКРАЇНСЬКОЇ МОВИ
THE USE OF INFORMATION-COMPUTER TECHNOLOGIES IN
UKRAINIAN LANGUAGE LESSONS**

d.p.s., prof. Bilavych G.V./ д.п.н., проф. Білавич Г.В.

ORCID: 0000-0002-1555-0932

Student Shevchuk N.O. / студентка Шевчук Н.О.

*Vasyl Stefanyk Precarpathian National University, Ivano-Frankivsk, Shevchenko, 57,
76025*

*Прикарпатський національний університет імені Василя Стефаника, Івано-
Франківськ, вул. Шевченка, 57, 76025*

Abstract. In the article the problem of forming communicative competence of primary school children through the use of information and computer technology (ICT). Today ICT is a required component of the educational process in elementary school. According to researchers, teachers, methodists, ICT include elements other educational technologies, in particular technologies of developing training, personality oriented teaching, interactive learning, project technology. Information technologies help to individualize and differentiate the studies of Ukrainian in initial classes. The uses of ICT do the lessons of Ukrainian and reading dynamic, bright, more effective.

Keywords: communicative competence, information and computer technologies, interactivity.

Introduction. Today, information and communication technology (ICT) is a required component of the educational process in elementary school. According to researchers, teachers, methodists, ICT include elements other educational technologies, in particular technologies of developing training, personality oriented teaching, interactive learning, project technology. The topicality of the use of ICT in



primary school confirming education documents, regulations and scientific - theoretical works. This shows the great attention of the state, scientists (teachers, psychologists) to this problem.

The main text. Methods of implementation ICT in the educational process of primary school principles and methods of teaching using ICT highlighted in the works Bykov, A. Gurzhii, Yuri Doroshenko Alexander Ershov, Yuri Zhuk, N. November, V. Monakhov, IA Pidlasoho, A. Spivakovsky and others.

To our opinion, the rates of development of ICT pass ahead scientific achievements in this industry. Contradiction between potential possibilities of informatively-communication technologies and degree of development of methods of their use in the educational process of initial school requires activation of scientific researches in relation to determination of concept of computer literacy and search of maintenance, forms, methods and facilities of her forming. Also important is a language aspect of possessing computer literacy of personality.

We are agree with results researches of scientists and practical teachers-workers of O. Butsyka, I. Vetrova A. Heine A. Goryachev, S. Gunko M. Levshina, N. Lustopad, Y. Mashbytsya F. Ryvkinda that the use of modern ICT at primary school has such basic advantages: differentiation of educational process comes true; there is effective diagnostics of intellectual and psychical level of development of child; control broadens after educational activity of pupils; the feed-back of this process is provided; the level of the personal interest of pupils rises in educational activity; creative flairs of primary schoolchildren are developed, cognitive activity of pupils rises in an educational process [3, p. 6].

On the other hand, teachers and scientists justly talk about risks that is carried for children by the Internet. One of them is appearance of in-words, computer slang. Situations happen, when parents do not understand, about what their are talked to put by phone with friends. Thing in slang – dialect, jargon, set of phrases and expressions that have narrow application and are not grammatically correct words in a language. In the modern Internet widespread enough is a computer slang – original «language» that arose up with appearance of electronic machines. On the modern stage of



development of society this problem, unfortunately, did not go round schoolchildren. To put younger pupils too apt to the use of slangy expressions. Knowledge of slang, jargon, that very often use schoolchildren during a communication in electronic communications, will help to avoid the numerous misunderstanding, ambiguous interpretation of information [2, p. 11].

Therefore task of teacher of initial classes on the lesson of Ukrainian - to form the culture of speech of junior schoolchildren. A teacher must watch, that children did not litter broadcasting slangy words.

When we were on pedagogical practice, then made sure: large possibilities of the use of ICT give the lessons of Ukrainian. ICT can be used on all stages of studies of Ukrainian : at explanation of new material, fixing, reiteration, control of knowledge, abilities, skills. Thus for a pupils a computer executes different functions: teacher, working instrument, object of studies, playing environment [1, p. 37]. Methodically the literate serve of material in the computer program assists the successful forming of personality competenses of students during the study of concrete theme. It is possible to use the reproductive testing, developing game, problem situation. A problem situation helps to draw conclusion. If a pupils made a mistake, it is possible to take advantage of prompts. For generalization and systematization of knowledge used the final testing that is complete every theme. Presentations cause large interest for students in an editor Power Point. Quickly knowledge of students allows to check work with texts. For this purpose text, in that there is skipped орфограми, пунктограми or sufferet errors, appears on one sliding seat. After writing of task students check up the work for the following to the sliding seat and propose estimations. This type of work is comfortable that junior schoolchildren see the errors at once, correct them and get estimations.

The worth-while experiment of the use of ICT at initial school we saw at Ivano-Frankivsk school №26. In spring in 2014 department of education entered in Ukraine a pedagogical experiment "Smart Kids". Within the framework of this experiment in the initial classes of school set projectors and interactive boards on that children execute educational tasks in a playing form. Games are a didactics, bright



and interesting. It costs to mark: an experiment from the use of ICT takes place in in the first class, with notebooks-plane-tables first-class boys already half-year work on two objects – mathematics and studies of deed (reading). Children use not mise, but stylus pen. According to class leader 1-C to the class of Alice Pawluk, on work actually with devices goes not more than 10 minutes to the day.

On every computer there is the program with textbooks, and in them theory and practical tasks. A teacher Alice Pawluk explains theoretical material at first, consequently children execute exercises. To the example, when first-class boys study some letter, then they must set accordance between the image of animal and letter on that she begins. Every student has headsets, all is accompanied by merry music, by the animated personages and wired for sound by child's voice. Therefore such process is named a “game“. Teacher convinced: such method of studies is more effective, than standard, for a lesson it is possible to do far anymore, for children there are many tasks. Who works quicker, does not expect other. For each there is an individual rate.

On adaptation to “Smart Kids“ in this experimental class spent approximately two weeks. The developers of project gave a sensory interactive board, projector free of charge, notebooks for class leaders and closet for storage of devices of students. Interactive board, talks A. Pawluk, helps on employments of reading. When children work over large texts, then not all schoolchildren have time, some do not want to watch. If not to hurry and not show to each a finger in a textbook, a teacher loaded an alphabet book on the notebook and on the large screen shows, on what sentence of text stopped. Alice Pawluk is sure that from such non-standard innovative studies already is benefit [4]. Interesting is the system of stimulation of studies of pupils. Every task in the program is a virtual egg. If a child executes him correctly - an owl hatches from there. And yet there is a reward – three stars. If an answer had inaccuracies, then an owl will hatch not fully and there will be less than asterisks. To our opinion, it interesting and original system of stimulation of studies of junior schoolchildren.

Summary and Conclusions. Thus, information technologies help to



individualize and differentiate the studies of Ukrainian in initial classes. The uses of ICT do the lessons of Ukrainian and reading dynamic, bright, more effective.

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Анотація. У статті висвітлюється проблема формування комунікативної компетенції молодших школярів на основі використання інформаційно-комп’ютерних технологій (ІКТ). Сьогодні ІКТ є обов’язковим компонентом освітнього процесу в початковій школі. ІКТ включають елементи інших освітніх технологій: технології розвивального навчання, особистісно орієнтованого навчання, інтерактивного навчання тощо та роблять уроки української мови динамічними, більш результативними.

Ключові слова: комунікативна компетенція, інформаційно-комп’ютерні технології, активні форми навчання.

Article sent: 27/03/2017 of

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j12-022

DOI: 10.21893/2227-6920.2017-12.022

**«THE TWINS SHALL MEET AGAIN»: EAGHOR G. KOSTETZKY'S
PASTICHE OF MYSTERY-PLAY STYLE****МІСТЕРІЙНА СТИЛІЗАЦІЯ ПЄСИ ІГОРЯ КОСТЕЦЬКОГО****«БЛИЗНЯТА ЩЕ ЗУСТРІНУТЬСЯ»****candidate of philology Bagriy M. A. / кандидат. філол. наук Багрій М.А.***Carpathian National University named after V. Stefaniuk, Ivano-Frankivsk, st. Shevchenko, 57,
76018**Прикарпатський національний університет ім. Василя Стефаника, Івано-Франківськ, вул.
Шевченка, 57, 76018*

Abstract. Ukrainian drama of early modernism often incorporates elements of mystery and miracle genres, which «plots are noted by unusual, mysterious, transcendent, too encrypted features, in fact that was a typological manifestation of a genre-composing function of dramaturgy and theatrical process in national literature and art of the late XIX – early XX centuries [3, p. 412]». While stylization and transformation of Christian mystery plots and imagery at that time was aimed at aesthetic interaction with world literature, the middle of the twentieth century, marked by rapid development of avant-garde, is particularly noticeable by coexistence of the sacred and profane, prompting scholars to speak about the appearance of neo-Baroque and postmodern ways of developing religious motifs.

Keywords: mystery-play, drama, Eaghor G. Kostetzky, modernism, play.

Introduction. Eaghor G. Kostetzky, one of the highly original masters of drama art of that time, eagerly undertook to rethink Baroque religious theatrical genres, often illustrating and pointing to common grounds in academic and popular culture. His dramas witness certain evolvement of Ukrainian theater when its relationship with the tradition was completely cut off, instead experiments with the genre form, language, style, story and composition become more relevant; they are often dominated by coincidence, illogic, irrationality, and mystification.

Mystery dramaturgy is divided into three groups: "Old Testament series" having its subject matter in biblical scenes; "New Testament series" telling the story of the



birth and resurrection of Jesus Christ, and "apostolic series" exploring "Lives of the Saints" and miracles about the saints. The play "The twins shall meet again" to some extent pastiches a structure of a mystery-play: it consists of three parts – the life, death and apocalypse. The first part describes the events at the New Year ball-masquerade, where two twin brothers come across each other. The names of the protagonists are identical, both are called Svyatoslav, but they have different meaning: Tohobochniy (the Other-sided) preaches the idea of nonviolence and non-killing whereas Tuteshniy (the Here-sided) fights the invaders, advocating the "liberation of the enslaved people" by any possible means.

Turning to the biblical story, it resembles the life of Cain and Abel, the sons of Adam and Eve. Abel, in contrast to his brother, was kind and pious. A girl Teresa is in love with Svyatoslav Tuteshniy, she is ready for any sacrifice for her beloved. But meeting another brother, Tohobochniy Svyatoslav, she prefers the kind one, as God preferred Abel's sacrifice. In the development of the second part of the play the twins quarrel and cause Teresa much trouble, besides Svyatoslav Tohobochniy accidentally has the other Svyatoslav's jacket with explosives to carry out a terrorist attack. After all, Svyatoslav Tuteshniy still manages to set an explosion on New Year's Eve, simulating apocalypse. This key episode in the composition of the play is also reminiscent of the biblical story when Cain murdered Abel. However, Eaghor G. Kostetzky makes more optimistic ending of the play: from the conversation between Colonel and Teresa we learn that the perpetrators are now in a neutral country and beyond the reach of police.

The play "The twins shall meet again" also displays such features of baroque theater as fragmentation and simultaneity of composition (for instance, in conversations of the first, second and third pairs). The play, as noted by O. Lyubenko, is abundant with the author's theorization: his reflections on the composition of the play are both direct (monologues of Prologue, Peter Tohobochniy) and indirect (remarks of the characters [2, p. 41]. It is necessary to point out that a character, symbolically named Prologue gives an idea of the depicted characters: "You have heard this story of two twins more than once. They were educated in different parts of



the world, brought to this stage and made act all sorts of things mixing up and confusing [1]." Prologue briefly describes other play characters – Peter Tuteshniy, Peter Tohobochniy, Colonel, Teresa, alluding to the ambiguity of their position. An example is an interlude about Colonel, "I think I do not understand this character well enough. Who is he – an old joker or a wise man wearing a jester cap? A typical representative of the environment or rather an exceptional character, a kind of a disguised symbol? It is unclear [1]". Its function, in our opinion, is to actualize a recipient, i.e. to involve the viewer in the process of decoding a meaning of the drama.

Changing masks is an intrigue point in the play. Playing as seen by Eaghor G. Kostetzky is the impossibility of choice, because the characters are allowed to choose only among masks who are the least true characters. Even love depends on a mask-face: Teresa is in love with Svyatoslav's face, not the man himself. Svyatoslav Tohobochniy, who represents the idea of nonviolence and nonkilling argues that his opponents destroy their personalities by self-denial. Logical links present in the play thus are destroyed, because the reader senses the instability of the text. This, together with a small pantomime and wordplay, give grounds for calling the play an absurdist one. In general, the image-schemes represent the play's main idea of the absolute figuration of being.

The other formal features of the play "The twins shall meet again" are subordinated to the above idea: the author does not inform a reader with *mise en scène* and staging features, emotional and gesture behavior of actors or their appearance. We learn about these details directly in the process of the play, where the author introduces music and film elements, various interjections, individual accounts of character's actions, tones of certain remarks.

Conclusions. We can state that Eaghor G. Kostetzky's pastiche of mystery-play style introduced into a dramatic work served several purposes: firstly, to visualize his views about the need to rethink the literary canon for style renewal of national literature, and secondly, to prove that the neo-Baroque way of modernizing literature is quite organic for Ukrainian culture.



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***Анотація.** Українська драматургія періоду раннього модернізму часто послуговувалася елементами містерій і міраклів, у «сюжетах яких спостерігається незвичайне, таємниче, трансцендентне, надто зашифроване, власне таке, що було типологічним проявом жанротворчої функції в розвитку драматургічно-театрального процесу національного письменства і мистецтва кінця XIX – початку XX століття [3, с. 412]». Якщо в той час стилізація і трансформація християнських містерійних сюжетів і образів мала переважно мету обробки вічних тем задля естетичного взаємобміну зі світовою літературою, – то в середині XX століття, коли актуалізувався авангардизм, стає особливо відчутним співіснування сакрального з профанним, що спонукало дослідників говорити про появу необарокових і постмодерних способів опрацювання релігійних мотивів.*

***Ключові слова:** містерія, драма, Костецький, модернізм, п'єса.*

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Article sent: 28/03/2017 of Maria Bagriy



j12-051

DOI: 10.21893/2227-6920.2017-12.051

THE SYSTEM OF AESTHETIC PRINCIPLES OF E. A. POE, THE IDEA OF
HARMONY OF LITERARY WORK IN THE CONCEPT OF THE POEM
“THE RAVEN”

СИСТЕМА ЭСТЕТИЧЕСКИХ ПРИНЦИПОВ Э. А. ПО, ИДЕЯ
ГАРМОНИИ ХУДОЖЕСТВЕННОГО ПРОИЗВЕДЕНИЯ В КОНЦЕПТЕ
СТИХОТВОРЕНИЯ «ВОРОН»

Omelchenko D. V. / Омельченко Д. В.

Vasyl Karazin Kharkiv National University, Kharkiv, Svobody Square 4

Харьковский национальный университет имени В. Н. Каразина, Харьков, пл. Свободы 4

Abstract. This article deals with the system of aesthetic principles of E. A. Poe, one of the first American Romantic writers, who tried to comprehend the nature and the purpose of the poesy. The main statements of his system are analyzed in this article in the concept of the poem “The Raven”. The idea of harmony of literary work is particularly important as a concept that has a strong effect on the further development of the world literature.

Key words: aesthetic principles, “unity of effect”, idea of harmony, rationalistic Romanticism

Introduction.

The artistic legacy of Edgar Allan Poe (1809-1849) amounts to 48 poems, about 70 novels, 2 stories and a few theoretic literary and philosophic writings, in total 4 poetical and 5 prosaic collections of works published in Poe`s lifetime. Poet, literary critic, visionary, inventor of the detective story, master of the macabre – Poe was recognized as one of the most influential and widely read American authors of the nineteenth century. Not only his literary estate is valuable, but also his contribution to development of the literary theory. Poe was one of the first American Romantic writers who tried to comprehend the nature and the purpose of the poesy and to work out a distinct system of the **aesthetic principles**. He insisted on using a strict method in every field of intellectual activity, including the art work, and paid much attention



to the form of his writings. In many key statements Poe's **literature theory** rests on the aesthetical judgments of the English poet S.T. Coleridge whose impact on the American Romanticism was truly great.

The main text.

Poe's writing reflects his literary theories, which he presented in his criticism and in essays such as "*The Poetic Principle*" (1850). He believed that meaning in literature should be an undercurrent just beneath the surface. Works with obvious meanings, he wrote, ceased to be art. He supposed that work of quality should be brief and focus on a specific single effect. Besides, he believed that the writer should carefully calculate every sentiment and idea.

The main purpose of a literary work Poe saw in achieving the "**unity of effect**". Everything in the work, including tone, theme, setting, characters, conflict, plot, as well as every single letter and punctuation mark, should stand for the "unity of effect". Once the first phrase is not linked with the main idea of the whole work of fiction, the purpose will not be compassed. Poe's poem "*The Raven*" (1845) is one of the most memorable in the English language and it is also a clear illustration of the author's method. Poe describes it in the essay "*The Philosophy of Composition*" (1846), and he claims to have strictly followed this method. T. S. Eliot said: "It is difficult for us to read that essay without reflecting that if Poe plotted out his poem with such calculation, he might have taken a little more pains over it: the result hardly does credit to the method." Biographer Josef Wood Krutch described the essay as "a rather highly ingenious exercise in the art of rationalization."

"The Raven", a narrative poem by Edgar Allan Poe, was first published in January 1845 and was later described by the author as an attempt to compose "a poem that should be at once popular and the critical taste." It actually illustrates the aesthetical principles of the writer, who denies the spontaneity of the creative process. Poe claims that creating a harmonic and beautiful work of fiction is not a momentary insight of talent, but a product of the intentional reflections and careful planning. In his essay "*The Philosophy of Composition*", that first appeared in the April 1846 issue of Graham's Magazine, the author describes the process of writing



his famous poem “The Raven”.

Some features of Poe’s aesthetic system can be summarized as follows:

1. Every element of the poem is well organized to keep to the rule that claims the “**unity of effect**”. The author states: “No one point in its composition is referrible either to accident or intuition — that the work proceeded, step by step, to its completion with the precision and rigid consequence of a mathematical problem.” The inner rhythms technique, the melodies, the alliteration and assonance system, the parallelisms and refrains bring the poem to perfection.
2. The idea of harmony, concinnity and proportionality of all the elements of the work comes to the aesthetical system that can be called “**rationalistic Romanticism**”. This system has combined a flight of fancy and a strict mathematical calculation alongside logic.
3. Poe’s definition of the poetry was “creating beauty with rhythm”. A new reality, unclear and mysterious, reality of dreams and vague thoughts, was created in his poems. But alongside this, the form of the work still has to be kept. The necessity of the form in artwork is one of the basic statements in Poe’s aesthetic system.
4. Informative moments quite often give place to frame of mind. The proper mood of the reader is formed not with the images of reality but with various associations, indefinite, mystic, appearing on the border of dream and reality. In this way Poe’s poetry causes a strong emotional response. The poet’s contemporaries said that reading his poems excite physical sensation of goose bumps.
5. The melodiousness of the poem is also a strong, in some way hypnotic, influence on readers. Author finds music as a flawless expression of the soul in poetry. Both sense and sound structures are combined in his work “to enveil them, as far as possible, in that Beauty which is the atmosphere and the essence of the poem.”
6. The repeating refrain that sound so scary “not only is limited to lyric verse, but depends for its impression upon the force of monotone — both in sound and thought.” The refrain had to divide the poem into stanzas and to be strong and impressing. These considerations led the author to the long *o* as the most sonorous vowel, in connection with *r* as the most producible consonant. When the sound of the refrain was determined, it became necessary to select a word, keeping with that melancholy of the tone of the poem. In such a search it would have been absolutely impossible to overlook the word “***nevermore***”, that first seems to be a mechanical repeating, but then sounds creepy as an answer for the questions full of hope.
7. The meter of the poem is mostly trochaic octameter, with eight stressed-unstressed two-syllable feet per lines. Combined with the predominating ABCBBB end rhyme scheme and the frequent use of internal rhyme, the trochaic octameter and the refrain of "nothing more" and "nevermore" give the poem a musical lilt when read



aloud. Poe also emphasizes the "O" sound in words such as "*Lenore*" and "*nevermore*" in order to underline the melancholy and lonely sound of the poem and to establish the overall atmosphere. Finally, the repetition of "nevermore" gives a circular sense to the poem and contributes to what Poe termed the unity of effect, where each word and line adds to the larger meaning of the poem.

Summary and Conclusions.

The distinct system of the aesthetic principles of E. A. Poe was analyzed as his contribution to development of the literary theory. The importance of using a strict method in the art work and attention to the form of his writings were considered. The main principles of Poe`s aesthetic system are summarized in the contexts of his poem "The Raven". Poe`s poetry is stated to be the take-off of a new symbolic poetry where the poetic technique is particularly important.

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Аннотация.

Аннотация: В статье рассматривается система эстетических принципов Э. А. По, одного из первых американских писателей-романтиков, стремившегося постичь природу и предназначение поэзии. Основные утверждения его системы анализируются в статье в концепте стихотворения «Ворон». Идея гармонии литературного произведения» особенно актуальна как концепт, оказавший сильное влияние на дальнейшее развитие мировой литературы.

Введение: Э.А.По считался не только одним из самых влиятельных американских писателей 19 века, его вклад в развитие литературной теории не менее ценен. Он стремился создать строгую систему эстетических принципов, которая и рассматривается в этой статье.

Основной текст: Произведения По отражают его литературную теорию, он считал, что каждый элемент стихотворения должен помочь создать «эффект целого», направленный на провоцирование максимально чувственного отклика в душе читателя. Ни один элемент композиции, сюжета, образов произведения не спонтанен, это результат упорядоченного расчета и целенаправленных размышлений. На примере стихотворения «Ворон» рассматривается практическое применение данной теории, служащей для создания максимально полного эффекта у читателя.

Выводы: Проанализирована строгая система эстетических принципов Э.А.По как его



неоценимый вклад в развитие литературной теории. В статье утверждается, что поэзия По указала путь развитию новой символистской поэзии, где особое значение имеет поэтическая форма.

Ключевые слова: эстетические принципы, «эффект целого», идея гармонии, рационалистический романтизм

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Article sent: 1/04/2017 of

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j12-076

DOI: 10.21893/2227-6920.2017-12.076

REVISITING THE PROBLEM OF LINGUISTIC ANALYSIS OF ENGLISH

ADVERTISING SLOGANS

ДО ПРОБЛЕМИ ЛІНГВІСТИЧНОГО АНАЛІЗУ АНГЛІЙСКИХ

РЕКЛАМНИХ СЛОГАНІВ

Kuchman I.M. / Кучман І.М.

Khmelnytskyi National University,

Khmelnytskyi, Instytutaska 11, 29016

Хмельницький національний університет,

Хмельницький, Інститутська 11, 29016

Abstract. The article deals with English advertising slogans; the paper characterizes linguistic, stylistic and rhetorical devices typical for advertising slogans; the article analyzes slogans at the graphical, phonological, lexical, syntactic and semantic levels of English language.

Key words: advertising slogans, advertising language, rhetorical devices, linguistic devices.

Анотація. В роботі розглянуто англійські рекламні слогани, охарактеризовано лінгвістичні, стилістичні та риторичні прийоми типові для рекламних слоганів, проаналізовано слогани на графічному, фонологічному, лексичному, синтаксичному та семантичному рівнях англійської мови.

Ключові слова: рекламні слогани, мова рекламних текстів, риторичні прийоми, лінгвістичні прийоми.

Introduction. Slogan is a short easily remembered distinctive and topical phrase, especially one used to advertise an idea or a product [2]. An advertising slogan is a sort of tag-line or a phrase that is created to express the importance and benefits of some product. Charles L. Whittier, author of *Creative Advertising*, says a slogan "should be a statement of such merit about a product or service that it is worthy of continuous repetition in advertising, is worthwhile for the public to remember, and is phrased in such a way that the public is likely to remember it" [11,



p. 403]. Geoffrey Leech maintains that the slogan is a short phrase used by the company in its advertisements to reinforce the identity of the brand. In his opinion, slogans are more powerful than companies' logos and can be easily remembered and recited by people. Also, the scholar states that slogans have to clearly state the main idea of the advertisement, i.e. they have to be easy to understand [8].

Everyday we witness appearance of tons of messages and catchphrases that appeal to us from every source possible ranging from print media to online advertisements. We get them either in visual or audio forms, though it works better when in both. Some of the slogans are memorized at once to be quickly forgotten, the others have come and gone that we hardly ever noticed. But there is a group of advertising slogans that is catapulted to fame by a hand of some genius. They really strike a chord and remembered for years. Such slogans have certain features in common. The nature of such slogans is viral. They spread out quickly and soon remembered and repeated by people of different ages and nations. Outstanding advertising slogans acquire proverbial qualities.

From a marketing perspective, good slogans are closely related to the things they promote. Once we hear them, we instantly recall the brand, the product or the idea they aim to advertise. So, in our brains there is an established strong association link between the slogan and the thing in focus. Excellent advertising slogans tend to outlive the products they advertise, such slogans end up living their own lives apart from the items they used to be related to. When there is no product or idea to advertise, but the slogan still exists, we can say that it has lost its marketing value, though it has definitely acquired some other range of values. The slogan is no more an advertising concept, it becomes an aphorism, a cultural phenomenon, an adage that is very interesting from a linguistic point of view.

The main text. In this paper, I set an aim to research the linguistic side of the phrases or sentences that serve as advertising slogans. In order to make the research area narrow enough in this article I will dwell on phonological, lexical, grammatical, semantic and stylistic features of advertising slogans.

Some scholars compare the language of advertising to the poetic language,



which is used by authors to create a special effect. Thus, the language of advertising, and especially of slogans, can be called a special language that helps to grab attention and make a person remember the slogan and the brand it advertises [3; 9]. Geoffrey Leech identifies four major functions of a successful advertisement, each of which has consequences on the language used to achieve those aims: 1) attention value; 2) readability; 3) memorability; 4) selling power [8]. Let's analyze these points in detail and give illustrations to them.

1. Attention value. Adverts need to attract attention and arouse curiosity. On the linguistic level, this can be achieved by breaking conventions of language use such as using *wrong spelling*: New SATISFRIES (Burger King); *friendship* (McDonalds); Eat Mor Chikin (Chick-fil-A), *neologisms*: iThink, therefore iMac (Apple); Hoover, Kleenex, Frisbee, Xerox, Tipex, Laundromat (these are some of the brand names or words were created especially for advertising and PR campaigns that are now used generically), *puns*: Absolut magic (Absolut Vodka); Because the Citi never sleeps (Citibank); Get Rich quick (Kenco Really Rich Coffee); If you want to impress someone, put him on your Black list (Johnnie Walker Black Whiskey); *grammatical solecism*: I quit school when I were sixteen (public service ad), To err is human, To er, um, ah is unacceptable (The Economist); *similes*: Easy as Dell (Dell); *metonymies*: You never actually own a Patek Philippe. You merely look after it for the next generation (Patek Philippe watch); *metaphors*: It gives you wings (Red Bull); Fresh Squeezed Glaciers (Adelma Mineral Water); Open Happiness (Coca Cola); *rhymes*: Flick your Bic (Bic); *semantic deviations and putting language in inappropriate or unorthodox contexts*, *paradoxes*: Nothing sucks like an Electrolux (Electrolux), Our products suck (Hoover).

2. Readability. Once the advert has succeeded in catching the reader's attention, this interest needs to be sustained, always reckoning with the fact that the reader searches for quick and simple information. Therefore, the style of adverts is mostly colloquial, using simple and familiar vocabulary. Leech has called this practice of using informal language associated with private contexts in public or business communication "public colloquialism". Informal styles suggest an easy-going social



relationship between reader and writer, and they are characterised by in formal address terms, direct address to the reader, mostly with the second person pronoun you, casual colloquial expressions and a relative lack of politeness markers. In adverts, even written language shows many features of spoken language.

First, advertising language is characterised by a high level of redundancy due to a high degree of repetition and parallelism. Moreover, there is the frequent use of deictics referring either to the user as an exophoric referent or to endophoric references such as pictures and other sentences in the copy. Terms like *this*, *that*, *those*, *it*, *here* and *there* indicate items in the immediate context and occur very frequently in advertising copy. For example: grown here. gobbled everywhere (McDonalds). Elliptic sentence structures are another sign of spoken communication that are typical of advertising language. Moreover, phrasal verbs, idioms and contractions, apostrophes are characteristic features of advertising language bearing witness to its strong degree of colloquialism. Here we have some examples: “Betcha can’t eat just one.” (Lays); Every Little Helps (TESCO); A customer is always and completely right! (Marks&Spencer); Hot’n juicy (Dave’s cheeseburgers); I’m lovin’ it (MacDonals’s); Finger lickin’ good (KFC).

3. Memorability. The message of an advert needs to be remembered by the recipient and recognised as familiar. Repetition is one of the most frequent techniques used in advertising to enhance memorability. From a linguistic point of view, several linguistic devices are highly repetitive by definition and therefore feature fairly frequently in advertising language, such as alliteration (repeating the initial sound): big. beefy. bliss (BigMac); For the men in charge of change (Fortune); Fluent in finance (Barclays Bank); Outwit. Outplay. Outlast. (Survivor TV series); **metrical rhythm** (repeating the same rhythmic pattern): Smooth Move (Veet); Intel inside (Intel); Everything We Do Is Driven By You (Ford); Live your life, love your home (IKEA); **rhyme** (repeating the same ending sounds): The “Wow” starts now (Microsoft Vista); Freshen-up with 7-Up (7-Up); Grace, space, pace (Jaguar); onomatopoeia (formation and use of words to imitate sounds): WASSSSSUP?! (Budweiser); Zoom-Zoom (Mazda), **grammatical parallelism** (repeating the same



grammatical structure) as well as *semantic* and *syntactic repetition* (i.e. using the same syntactic structure or words from the same word field) and *lexical repetition*: Don't dream it. Drive it! (Jaguar); Melts in your mouth, not in your hands (M&Ms); I am what I am (Reebok); Beauty outside. Beast inside (Mac Pro); American by birth. Rebel by choice (Harley Davidson). It has to be noted that repetition and variation often go hand in hand. Semantic repetition, i.e. the repeated use of different words from the same word field, is an incidence of lexical variation which at the same time functions as a repetitive device. Moreover, the continuous repetition of slogans, brands and product names equally contributes to the memorability of the product and the related advertising messages. The type of repetition when words or groups of words in successive clauses are repeated, this is a rhetorical device called *anaphora*. In case each sentence or clause ends with the same word, this type of repetition is called *epiphora/epistrophe*. All these types of repetition lay emphasis on a particular idea. Consider the following examples: If anyone can, Canon can (Canon); Buy it. Sell it. Love it (Ebay); It keeps going, and going, and going (Energizer Batteries); Get N or get out (Nintendo 64); Share moments. Share life (Kodak); See new. Hear new. Feel new (Nokia); *comparison* (a rhetorical or literary device in which a writer compares or contrasts two people, places, things, or ideas): Stronger than dirt (Ajax); We sell more cars than Ford, Chrysler, Chevrolet, and Buick combined (Matchbox); Probably the best beer in the world (Carlsberg); *antithesis* (contrasting ideas sharpened by the use of opposite or noticeably different meanings): Small seeds generate big ideas (CNN); *hyperbole* (a figure of speech which contains an exaggeration for emphasis): The Closest Your Dog Will Ever Get To Being A Dragon (Purina Dog Food); Takes You Miles Away in Seconds (Lexus).

4. Selling power. Ultimately, advertisements want to sell. Prompting people to take the right kind of action can be best achieved by clear instructions as what to do next. **Imperatives** are ideally suited to tell people clearly what kind of action to take and therefore feature very frequently in advertising language. Not without reason are imperatives, one of the most frequently used syntactic forms in advertising language. Here are some of the most famous ads with imperatives: Just do it (Nike); Make the



most of now (Vodafone); Live in your world. Play in ours (Playstation). Due to the tendency to use elliptical sentence structures and omitting subjects, however, imperatives are often not perceived as open instructions but rather as shortened sentences or fragments of statements. For instance: Think big (Imax); Think small (Volkswagon); Think different (Apple); Save money. Live Better (Walmart); Expand your mind, change your world (NewStatesman); See what we mean (Canon EOS). Moreover, advertising copy strives to be positive and to give its recipients a positive outlook. For instance: At the heart of the image (Nikon); The happiest place on earth (Disneyland); The Spirit of Travel (Louis Vuitton); Relationships that are invested in your success (Wells Fargo). Prohibitions and negative forms are usually avoided, unless they are used as an element of surprise to create attention value. This approach is also justified from a psychological and cognitive perspective, as negative forms require a longer processing time than positive statements. For example: Don't be evil (Google); When there is no tomorrow (FedEx); Impossible is Nothing (Adidas); There is no substitute (Porsche); The greatest tragedy is indifference (Red Cross). The strategy of using positive forms also extends to the lexical level. Particularly adjectives with a positive meaning play a major role in advertising language. Leech quotes the following adjectives to be among the most frequent ones in advertising language: *new, good / better / best, sure, delicious, free, fresh, nice*. All of these words have an entirely positive meaning. Here are some illustrations: Eat fresh (Subway); Good to the last drop (Maxwell House).

Conclusions. There is a number of language and rhetorical devices typical for advertising slogans: capitalization, rhyme, alliteration, repetition, word play (pun), metaphor, etc. and analyze slogans at the graphical, phonological, lexical, syntactic and semantic levels. At the graphic level slogans demonstrate the usage of full or partial capitalization as well as unconventional spelling, while at the phonological level the extensive use of rhyme, alliteration, assonance and (less often) onomatopoeia can be observed. At the lexical level slogans exercise the use of pronouns, unqualified comparison, coined words, numerals, adjectives and verbs. Everyday sentences/phrases, imperative sentences, questions, statements, idioms or



proverbs, ellipsis, parallelism, repetition (anaphora, epiphora) are used at the syntactic level. Puns, metonymy, metaphor, synecdoche, personification, simile, hyperbole, antithesis can often be identified at the semantic level. In our analysis of advertising slogans we focused on language and rhetorical devices, i.e. figurative language and sound techniques that are used for effective slogans at the phonological, lexical, syntactic and semantic levels.

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Article sent: 21/12/2016

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CHEMISTRY

j12-030

DOI: 10.21893/2227-6920.2017-12.030

TEMPERATURE TRANSITIONS IN POLYESTERS BLOCK COPOLYMER
RESINSТЕМПЕРАТУРНЫЕ ПЕРЕХОДЫ В ПОЛИЭФИРНЫХ БЛОК-
СОПОЛИМЕРАХ

d.ch.s., prof. Vazheva R.Ch. / д.х.н., проф. Бажева Р.Ч.

ORCID: 0000-0002-2310-7711

с.р.с., as.prof. Vazhev A.Z. / к.п.н., доц. Бажев А.З.

Kabardino-Balkar State University, Nalchik, Chernishevskaya st. 173, KBR, 360004

Кабардино-Балкарский государственный университет, Нальчик, ул. Чернышевского, 173

Abstract. The main temperature transitions in polycarbonates and polycarbonate–polytetramethylenoxide block copolymer resins, obtained by acceptor-catalytic polycondensation in solution, were studied by the method of differential scanning calorimetry. The obtained results show that a microphase separation of hard and elastic blocks is observed in polycarbonate–polytetramethylenoxide block copolymer resins. As PC and PTMO blocks can crystallize, both vitrification temperature and melting temperature of different phases is fixed.

Key words: polycarbonate, melting temperature, crystallinity.

Introduction.

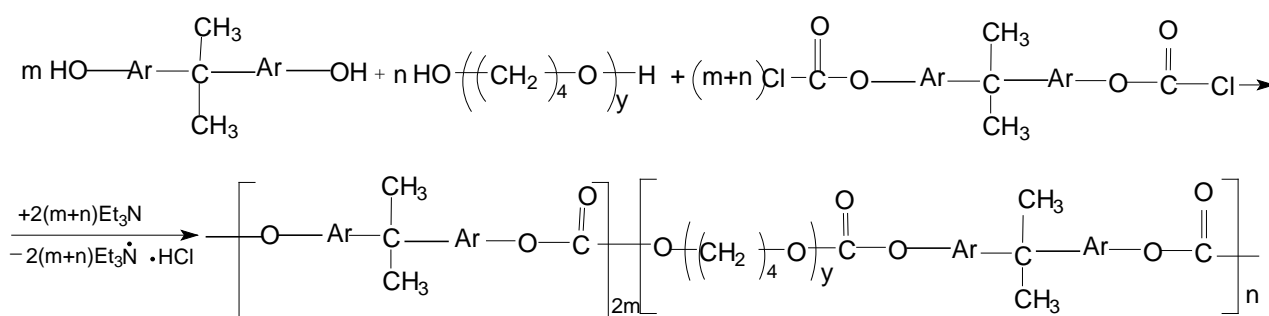
Physical-chemical properties of polymers, and particularly block copolymer resins (BCR) are determined by their phase state and phase morphology to a significant degree [1]. That is why these characteristics of polymers are very important for understanding a number of processes, taking place in their treatment and use. It is known that macromolecules of polycarbonate (PC) are characterized by a great rigidity, limited by the rotation of aromatic nuclear and due to this reason they are weakly tend to crystallization. Industrial PC is a vitreous polymer which has both short and long range ordering areas. The degree of crystallinity does not usually



overcome 10-15 %, and it can reach 30-40% only after special treatment of specimens [2-4].

The main text

Temperature transitions in polycarbonate–polytetramethylenoxide (PC-PTMO) block copolymer resins, obtained in solutions by the method of acceptor – catalytic polycondensation are studied in the scheme:



The calorimetric curves of PC and PTMO were taken for comparison. On the thermogram for PC there was only one change at 417 K, corresponding to its vitrification temperature. The transition, connected with PC melting was absent, i.e. polycarbonate film had a liquid-like structure. However, as it has already been pointed out, according to the literature data, PC crystallizes in certain conditions and its melting temperature varies in the interval from 493 to 503.

For PTMO with the molecular weight 2000 and terminal hydroxyl groups the following temperature transitions are found: $T_v=192$ K, $T_m=300$ K, $Q_m=21,4$ cal./g.

Calorimetric investigations showed that PC and PTMO blocks in such block copolymer resins are partially combined. The dependences of temperature transitions are shown in Table.

As it was shown, the mean temperatures of vitrification, which are different from T_v of homopolymers, are observed for all the specimens in a high temperature area. With the increase of content of PTMO blocks the meanings of T_v move to the area of a low temperature. Moreover in BCR, containing up to 40% PTMO blocks, a partial combination of PC and PTMO blocks take place and T_{v1} of plasticized PC phase and T_{m2} PTMO phase is observed for them only. If contents of PTMO blocks in BCR is more than 30% of its weight, a more complex apportionment into separate phases, which are characterized by their vitrification temperatures (T_{v2}) and melting



(T_{m2}), is observed.

Table

The main temperature transitions in PC-PTMO BCR resins

Structure of PK-PTMO BCR, % mass.	T_g PK phase, K	T_g PTMO phase, K	T_m PK phase, K	T_m PTMO phase, K
100:0	422	-	493	-
90:10	415	-	-	294
60:40	343	189	493	291
50:50	338	191	494	290
40:60	323	195	493	289
0:100	-	192	-	294

Simultaneously, the melting temperature of crystallite PC phase (T_{m1}) develops. Temperature T_{v1} is still lowering and this fact testifies the partial compatibility of PC and PTMO blocks and in the area of BCR constituents.

The melting degree of the crystallinity phase formed of PC blocks, and the degree of crystallinity rise with the increase of contents of PTMO blocks. The maximal degree of crystallinity (about 16%) in the studied line is achieved under containing PTMO blocks at about 60% of its weight. It is found out that PC PTMO block copolymer resins are sensitive to the change of the regime heating-cooling. For instance, the repeated processes of heating-cooling lead to lowering of T_{v1} up to 5-7 degrees. We may suppose that the observed phenomenon is connected with the partial thermal – oxidative degradation of BCR, and with the reaction of interchain exchange. Both of them should lead to improving compatibility of PC and PTMO blocks. The melting temperature of the PC phase does not change significantly.

Summary and Conclusions.

The obtained results show that a microphase separation of hard and elastic blocks is observed in PC PTMO block copolymer resins. As PC and PTMO blocks can crystallize, both vitrification temperature and melting temperature of different phases is fixed.



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Аннотация.

Методом акцепторно-каталитической поликонденсации получены поликарбонат-политетраметиленоксидные блок-сополимеры. С помощью метода дифференциальной сканирующей калориметрии изучено фазовое состояние синтезированных блок-сополимеров. Найдено, что в исследованных образцах блок-сополимеров имеет место микрофазовое разделение жестких и эластичных блоков. В зависимости от состава блок-сополимеры проявляют свойства термoplastов либо термоэластопластов.

Ключевые слова: поликарбонат, температура плавления, кристалличность

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Article sent: 29/03/2017 of

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j12-042

DOI: 10.21893/2227-6920.2017-12.042

УДК 541.127 + 547.833.220

NATURE OF NORMAL SALT EFFECT IN HETEROLYSIS REACTIONS**ПРИРОДА НОРМАЛЬНОГО СОЛЬОВОГО ЕФЕКТУ В РЕАКЦІЯХ****ГЕТЕРОЛІЗУ****s.ch.s., as.prof. Ponomarev M.E. / к.х.н., доц. Пономарьов М.Є.**

ORCID: 0000-0002-2736-2269

s.ch.s., as.prof. Kamenska T.A. / к.х.н., доц. Каменська Т.А.

ORCID: 0000-0001-9216-0201

stud. Shendryk A.M. / студ. Шендрик А.М.*National technical university of Ukraine "Igor Sikorsky Kyiv polytechnic institute", Kyiv,**Peremogy ave. 37, 03056**Національний технічний університет України «Київський політехнічний інститут**імені Ігоря Сікорського», Київ, просп. Перемоги 37, 03056*

Abstract. Kinetic analysis of normal salt effect in the reactions of unimolecular heterolysis (S_N1 , $E1$, unimolecular solvolysis) is undertaken. Normal salt effect is a linear augmentation of the reaction rate with increase of salt concentration. Normal salt effect is treated as catalytic effect of various salt species (cations, anions, and ion pairs) on the reaction's step of covalent substrate conversion into substrate's contact ion pair. It is shown that S_N2 reaction can't be the cause of the effect. Energy diagram for the normal salt effect is adduced. The ways for further investigations are outlined: evaluation and comparison of activation parameters of the reactions in the presence of a salt and without the latter and elucidation of the nature of acting salt species.

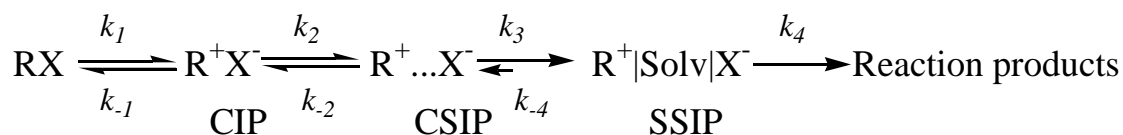
Key words: normal salt effect, unimolecular heterolysis, covalent substrate, contact ion pair, catalysis, activation parameters.

Introduction.

The salt additions play significant role in chemical reactions, changing the reaction rates, altering their course, promoting exchange of the leaving groups, and providing the change of direction of a reagent's attack on a substrate (altering



regioselectivity). Reactions of unimolecular heterolysis (S_N1 , E1, unimolecular solvolysis) are especially sensitive to the effects of the salts since they run through consecutive formation of cationoid intermediates, which are appropriate targets for attack of salt species [1].



CIP - contact ion pair; CSIP - cavity separated ion pair; SSIP - solvent separated ion pair

The effects of salts on the rates of unimolecular heterolyses reactions were discovered by Ingold and Hughes, but the term “normal salt effect” was proposed by Winstein for linear augmentation of the reaction rate with increase of salt concentration to distinguish it from “special salt effect” [2]. For quantitative evaluation of normal salt effect Winstein proposed an equation (1), which is known now as Winstein equation

$$k = k_0 (1 + b[\text{salt}]) \quad (1)$$

Where k is rate constant under salt effect, k_0 is rate constant without salt, $[\text{salt}]$ is salt's concentration, mol/l, b is sensitivity of reaction to effect of the salt.

The main text

Initially normal salt effect (“positive salt effect” before differentiation to normal salt effect and special salt effect) was considered as the result of augmentation of ionic strength of a solvent and was also called as “ionic strength salt effect” [3]. Later it was proved that normal salt effect is a specific one since coefficient b in Winstein equation significantly differed when different salts affected the same reaction in the same solvent. Moreover, sometimes some salts do not affect the reaction rates at all on the whole concentration range studied – these facts strictly contradict to ionic strength concept.

Cation, anion or salt ion pair may be salt acting agent in normal salt effect. Unlike special, normal salt effect is specific, it highly depends on the nature of salt, substrate, solvent, in some cases the value of the effect varies within 2-4 powers of



ten. However, usually efficiency of normal salt effect is relatively low - b values in Winstein equation vary within the range from 4 to 40. For special salt effect b values vary within the range 100 – 5000 [2].

The nature of normal salt effect is under discussion. All the contributors agree that effect is caused by interaction between the salt species and a covalent substrate. Loupy and Tchubar consider it as bimolecular process, parallel to unimolecular heterolysis [3], but do not mention that it is S_N2 process. From our point of view, now it is enough evidences that this effect has pure catalytic nature and is not a S_N2 reaction. First of all, it was shown that the effect was caused not only by interaction between anions of salt and covalent substrates, but also it caused by interaction between cations and ion pairs of salts and the substrates. The second reason for the lack of S_N2 process is that there is no relation between nucleophilicity of anion and the magnitude of the salt effect [2]. We suppose normal salt effect has catalytic nature: interaction between salt species and molecule of covalent substrate forms triple ions or quadrupoles which have lower values of free energy than contact ion pairs have. These triple ions or quadrupoles form transition states (TS) of the reactions lower than TS of non-catalytic heterolysis reactions and, therefore, accelerate the process of heterolysis (Fig.1.)

Such consideration of the nature of normal salt effect allows propose two directions for further investigations:

1. To elucidate what salt species (anions, cations, or ion pairs) react in certain cases of the effect.
2. To study temperature dependences of the reactions in the presence of the salts and without it and to determine activation parameters (ΔH^\ddagger and ΔS^\ddagger) for non-catalytic and catalytic reaction pathways.

Summary and Conclusions.

The nature of normal salt effect in the reactions of unimolecular heterolysis is considered. Normal salt effect is highly specific, it's magnitude strongly depends on the nature of salt, substrate, and solvent. This effect has catalytic nature and is not a S_N2 reaction. It is caused by interaction between salt species (anions, cations, and ion



pairs) and the molecules of covalent substrates. For future research it is proposed to study temperature dependences of the reactions in the presence of the salts and without it and to determine activation parameters (ΔH^\ddagger and ΔS^\ddagger) for non-catalytic and catalytic reaction pathways.

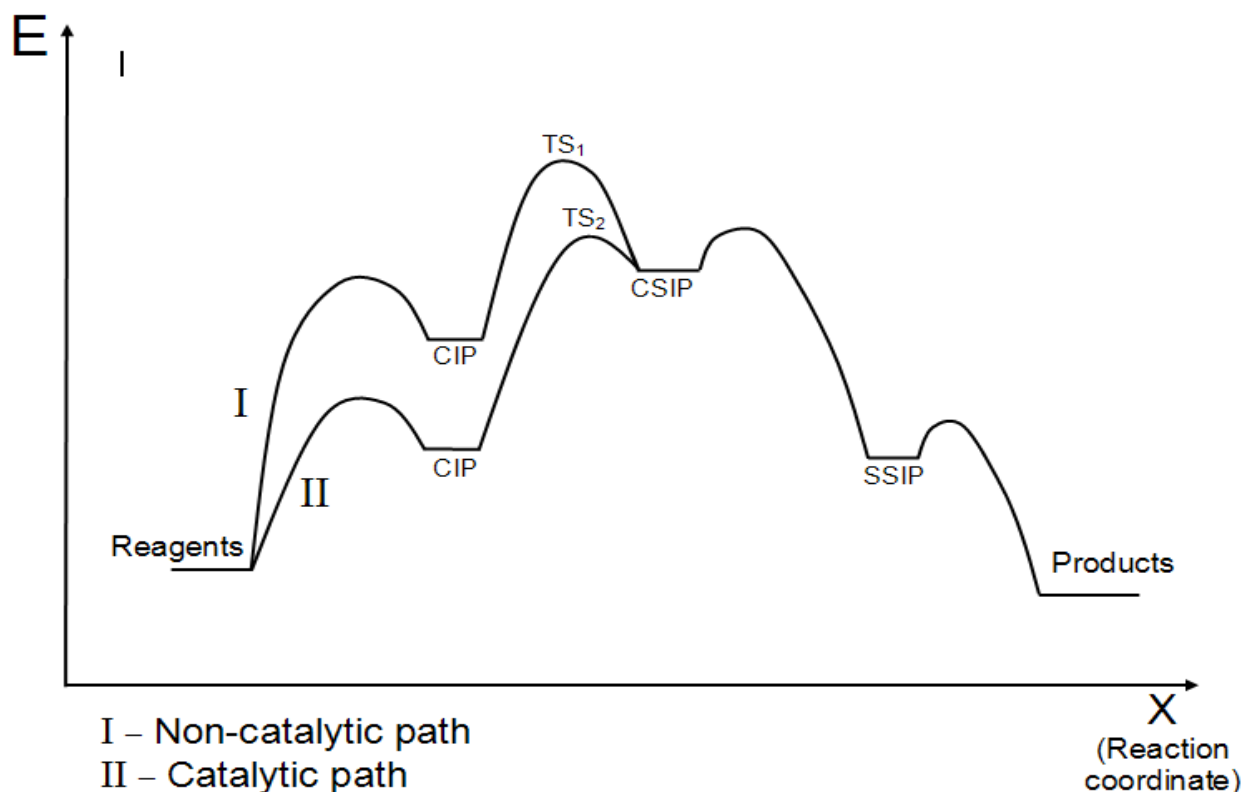


Figure.1. Energy diagram for the normal salt effect.

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Анотація.

Проведено кінетичний аналіз нормального сольового ефекту в реакціях



мономолекулярного гетеролізу (реакції S_N1 , $E1$, мономолекулярний сольоліз). Нормальний сольовий ефект (лінійне збільшення швидкості реакції при збільшенні концентрації солі у реакційному розчині) трактується як каталіз перетворення ковалентного субстрату в контактну іонну пару при дії часток солей (аніонів, катіонів, іонних пар). Показано, що участь реакції S_N2 у нормальному сольовому ефекті є малоімовірною. Наведено енергетичну діаграму нормального сольового ефекту. Намічено шляхи подальших досліджень сольових ефектів: отримання і порівняння активаційних параметрів реакцій як у присутності солей, так і за їхньої відсутності; в'яснення природи діючих часток солі у кожному випадку сольового ефекту.

Ключові слова: нормальний сольовий ефект, мономолекулярний гетероліз, ковалентний субстрат, контактна іонна пара, каталіз, активаційні параметри.

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Article sent: 31/03/2017 of

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j12-025

DOI: 10.21893/2227-6920.2017-12.025

THE FORMATION OF AN IDEAL DISPLACING CHROMATOGRAM OF ONE SUBSTANCE

ФОРМИРОВАНИЕ ИДЕАЛЬНОЙ ВЫТЕСНИТЕЛЬНОЙ ХРОМАТОГРАММЫ ОДНОГО ВЕЩЕСТВА

c.ch.s., as.prof. Kiyanovskiy A.M. / к.х.н., доц. Кияновский А.М.

Kherson State Agrarian University, Kherson, Stretenskaya 23, 73006

Херсонский государственный аграрный университет, Херсон, ул.Стретенская 23, 73006

Abstract. The paper looks at the main regularities of displacing chromatography at the example of equilibrium displacing dynamics of one substance sorption when the factors of fuzziness of front zones are absent.

The study defines the conditions under which the mode of displacing dynamics of sorption occurs. It reveals the impact of the type of sorption isotherm of a displaced substance and a displacer on the character of displacing chromatogram formation.

Key words: dynamics of sorption, displacing chromatograms, formation.

Introduction. To establish the main regularities of the displacement mode of sorption dynamics, let us consider the simplest case - the ideal displacement dynamics of the sorption of one substance.

With an ideal sorption dynamics, sorption equilibrium is instantaneously established and there are no factors that cause a blurring of the sorption fronts [1, 3, 4].

The main text. Let an ideal front chromatogram, the primary zone of one substance, be formed in the sorbent column (Fig.1, a).

The initial and boundary conditions have the following form:

$$\begin{aligned} t=0, 0 \leq x \leq x_0, n = n_0, N=N_0; \\ x > x_0, n=0, N=0, \end{aligned} \quad (1)$$

where t – time, x – coordinate of the distance (along the column length of the sorbent), n_0 and N_0 - linear concentrations of matter in the mobile phase and sorbent, respectively.



We introduce a propellant substance into the sorbent column. With instantaneous sorption of the displacer, the initial and boundary conditions are as follows:

$$\begin{aligned} t > 0, x = 0, n = n_d^0, N = N_d^0; \\ x = \infty, n = 0, N = 0, \end{aligned} \quad (2)$$

where n_d^0 and N_d^0 - linear concentrations of propellant.

The velocities of the cut-off boundaries of the zones can be found as the velocity of the concentration points on the basis of the substance balance [3, 4]:

$$v = u \frac{n}{n + N}, \quad (3)$$

where u – mean linear flow rate of the mobile phase.

Average speed u can be found experimentally by the obvious formula

$$u = \frac{V}{Qt}, \quad (4)$$

where V - the volume of the mobile phase introduced into the porous medium in time t ; Q - the cross-sectional area of the transfer of a sorbed substance in this medium.

If we introduce a distributive relation $h = \frac{n}{N}$, then

$$v = u \frac{h}{1 + h} \quad (5)$$

For the displacement process, the propellant velocity v_d should be higher than speed v displaced substance, $v_d > v$.

If $v_d \leq v$ (or $h_d \leq h$), then there is an elution dynamics of sorption [5].

With displacement sorption, the trailing edge of the primary zone moves with the velocity of the leading edge of the displacement zone v_d , And the velocity of the leading edge of the primary zone remains equal to v .

This means that a new zone of displaced primary substance with a concentration of n' and the zone of the primary component is compressed (Fig.1, b). The process of formation of a pressure chromatogram is shown for the case $n' > n$.



Since the width of the newly formed zone increases, this means that the velocity of the leading edge of this zone $v' > v_d$, so that $v' > v_d > v$. Thus, the forming zone with concentration n' expands, but primary with concentration n_0 is reduced, and at some point in time the primary zone disappears. From this moment on comes the stationary stage of the process of displacement, the leading edge of the newly formed zone, and hence the displacer and the displaced substance move with the velocity of the displacer v_d (Fig.1, B).

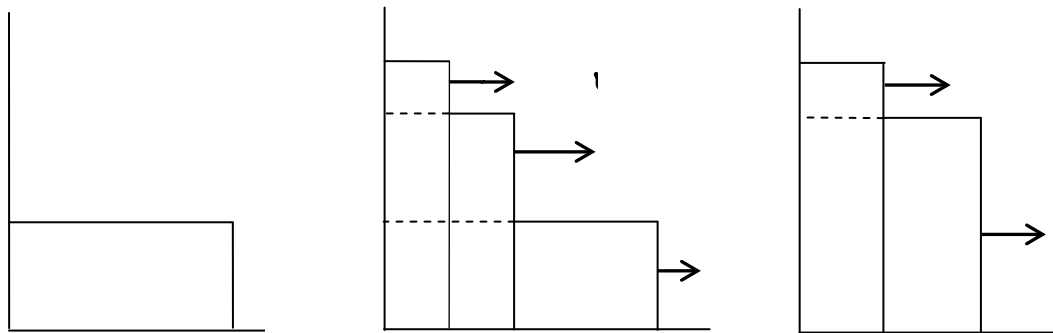


Figure.1. Formation of a displacement chromatogram under a convex isotherm of sorption of a displaced substance

The width of the primary zone decreases with speed $v' - v$, So this zone disappears in time

$$t = \frac{x_0}{v' - v}, \tag{6}$$

where $x_0 = vt_0$ - width of the primary zone, t_0 – the time of formation of this zone.

Thus, the formation time of the displacement chromatography

$$t = \frac{x_0}{v' - v} = t_0 \left(\frac{v'}{v} - 1\right)^{-1} \tag{7}$$

The process of formation of the displacement chromatogram is determined by the type of isotherms of the displaced substance and the propellant. Figure 2 shows possible combinations of the isotherms of the displaced substance and the propellant d , under which the condition of the displacement dynamics of sorption can be satisfied $v_d > v$ (or $h_d > h$).

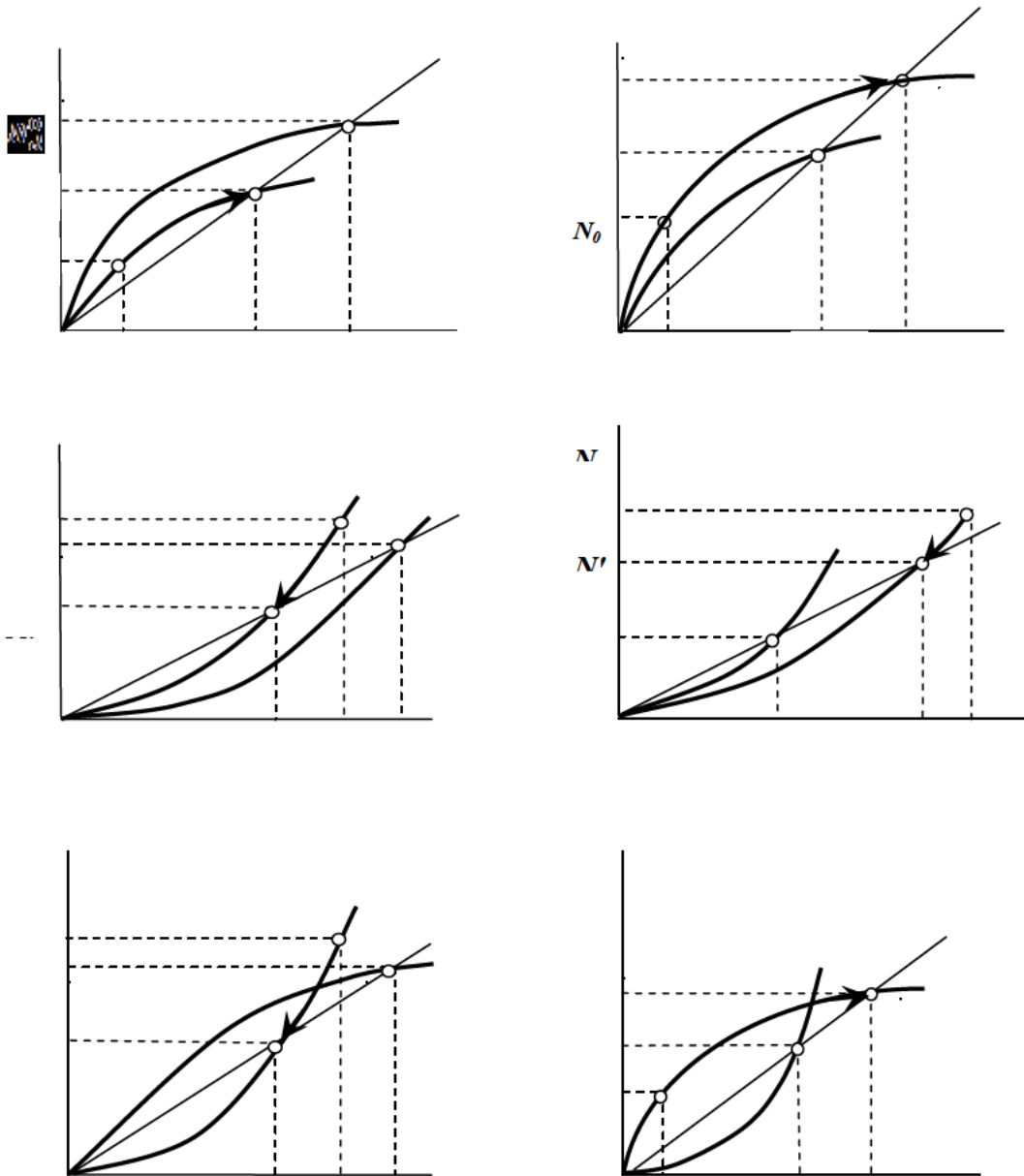


Figure.2. Determination of the concentration n' in the zone of the stationary pressure chromatogram with different combinations of sorption isotherms of the displaced substance and the propellant d

If the isotherm of the displaced substance is known, then it is possible to select the concentration of this primary component in the solution and such a displacer and its concentration so that condition $h_d > h$.

Let both isotherms be convex, the concentration of the primary substance n_0 and the corresponding linear concentration N_0 Of this component in the sorbent (Fig.2, a).

Isotherm of the propellant d is located above the isotherm of the primary



substance, which indicates better sorbability of the propellant.

To implement the displacement regime, it is necessary to select such a

concentration of the propellant n_d^0 , so that $h_d = \frac{n_d^0}{N_d^0}$ there was more $h = \frac{n_0}{N_0}$. For this

we draw a straight line $N = \frac{I}{h_d} n$, below the point (n_0, N_0) . In this case, the displacement mode is realized.

If the point (n_0, N_0) is below this line, then there is an elution sorption [3, 5].

At the end of the formation of pressure chromatography $v' = v_d$ and $\frac{n'}{N'} = \frac{n_d^0}{N_d^0}$. This means that the point (n', N') lies on this line, so that $n' > n_0$, concentration n' greater than the concentration of the component n_0 in the primary zone. The direction of the change in concentration is indicated by an arrow on the isotherm of the displaced substance.

If the propellant is sorbed weaker than the displaced substance, the displacement isotherm is located below the isotherm of the primary component (Fig.2, б). And in this case one can find such a concentration of the displacer n_d^0 , so that point (n_0, N_0)

was located above the direct $N = \frac{1}{n_d} n$, passing through the point (n_d^0, N_d^0) . Then $h_d > h$, the displacement mode.

Concentration n' in the stationary zone is at the point of intersection of the

straight line $N = \frac{1}{n_d} n$ with an isotherm of a displaced substance.

With convex isotherms of the displacer and the displaced substance, regardless of whether the displacer is sorbed more weakly or stronger than the primary component, the concentration n' substances in the stationary zone are greater than the concentration n_0 in the primary zone (Fig.2, а, б).

The formation of a displacement chromatogram for convex isotherms is shown in Fig.1.

In the case of concave isotherms (Fig.2, в, г) a displacement mode is also



possible, but the concentration n' displacing agent is less than the primary n_0 .

In this case, according to the law of conservation of mass, the width of the stationary zone is greater than the width of the initial zone.

The time of formation of the pressure chromatogram

$$t = t_0 \left(\frac{v_d}{v} - 1 \right)^{-1} \quad (8)$$

Similarly, it is possible to analyze the displacement process in combinations of convex and concave isotherms of a displacer and a displaced substance (Fig. 2, д, е).

With a convex isotherm of the displaced substance, regardless of whether the convex or concave sorption isotherm of the displacer, the concentration of this substance in the stationary zone n' more concentration n_0 in the primary zone (Fig.1).

On the other hand, with concave isotherm of the displaced substance, concentration n' it is in the stationary zone less than the concentration n_0 In the primary zone, regardless of the shape of the displacement isotherm (Fig.3).

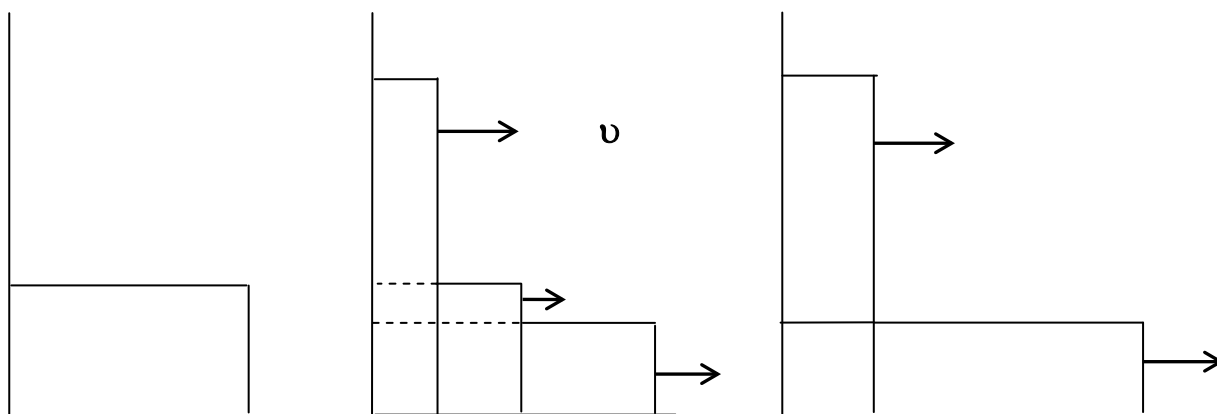


Figure.3. Formation of a displacement chromatogram with a concave isotherm of sorption of the displaced substance

The equivalence of ion exchange, due to the electroneutrality of the chromatographic system, simplifies the study of the formation of an equilibrium ion-exchange chromatogram of a single substance.

Suppose that a rectangular zone of ion 2 is introduced into a column of ion exchanger saturated with ions 1. The ion exchange capacity N_0 , the concentration of ion 2 in the mobile zone is n_0 (Fig.4, a).

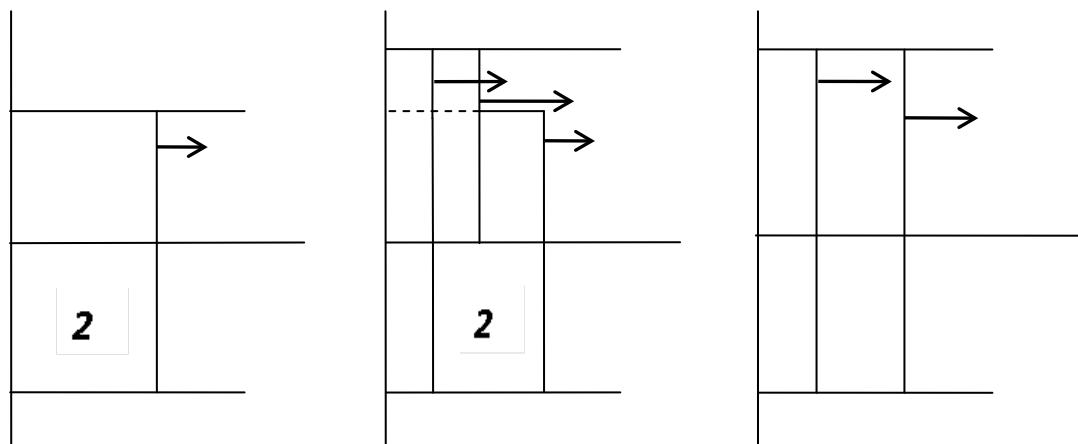


Figure.4. Formation of exclusion ion-exchange chromatogram

We now introduce into the column an ion-propellant d , whose concentration is n_d^0 .

Formation of a pressure chromatogram at $n_d^0 > n_0$ (or $h_d > h_0$) is shown in Fig.4.

The speed of the leading front v' the new zone is determined by the balance of ion 2:

$$(v' - v_d) (n_d + N_0) = (v' - v) (n_0 + N_0) \tag{9}$$

On the other hand

$$v_d = u \frac{n_d^0}{n_d^0 + N_0}; v = u \frac{n_0}{n_0 + N_0} \tag{10}$$

From the equalities (9) and (10) we have $v' = u$.

Then the width of the initial zone decreases with the speed $v' - v = u - v$, And the formation time of a new, stationary zone

$$t = \frac{x_0}{u - v} = \frac{v t_0}{u - v} = t_0 \left(\frac{u}{v} - 1 \right)^{-1} = t_0 \left(\frac{u}{u n_0 / (n_0 + N_0)} - 1 \right)^{-1} = t_0 \frac{n_0}{N_0} = t_0 h_0 \tag{11}$$

Summary and Conclusions. The study of sorption problems under the equilibrium regime and in the absence of diffusion and quasidiffusion factors of front blurring makes it possible to determine the effect of the sorption isotherm on the sorption dynamics.

In particular, this makes it possible to determine the conditions for the realization of the displacement process for various forms of sorption isotherms for the



displaced substance and the propellant.

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Аннотация.

В работе основные закономерности вытеснительной хроматографии рассматриваются на примере равновесной вытеснительной динамики сорбции одного вещества в отсутствие факторов размытия фронтов зон.

Определены условия, при которых осуществляется режим вытеснительной динамики сорбции. Выявлено влияние вида изотерм сорбции вытесняемого вещества и вытеснителя на характер формирования вытеснительных хроматограмм.

Ключевые слова: динамика сорбции, вытеснительные хроматограммы, формирование.

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Article sent: 31/03/2017 of

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j12-015

DOI: 10.21893/2227-6920.2017-12.015

APPLICATIONS OF CLAY MATERIALS IN THE COMPOSITION

WITH BASALT FIBER

ЗАСТОСУВАННЯ ГЛИНИСТИХ МАТЕРІАЛІВ У КОМПОЗИЦІЯХ З

БАЗАЛЬТОВИМ ВОЛОКНОМ

с.т.с., as.prof. Shevchenko V.M. / к.т.н., доц. Шевченко В.М.

as.prof. Guts N.A. / ст.викл.Гуц Н.А.

National Technical University of Ukraine "KPI", Kyiv, Peremogy av., 37

Національний технічний університет України «КПІ», м. Київ, пр. Перемоги, 37

Abstract. The article describes influence of surface treatment of clay mineral with a solution of electrolyte of calcium chloride on the formation of coagulation structures with the necessary structural-mechanical and biocidal properties; affecting the clay particles surface by the solution of electrolyte-peptizing of sodium hydroxide on ion-exchange reactions and creation of stabile thixotropic structure with necessary physical-mechanical and biocide properties.

Key words: bentonite clays, materials' resistance to fungi, inorganic fiber, basalt fiber.

Introduction. There is a vital problem of creation the biocide paper material which may resist the bacteria (biocide), mold fungi (fungicide) and insects (insecticide). Nowadays in most cases this problem may be solved by means of inorganic fibers, for example basalt ones. It concerns the matters of packaging of various products of long-term and short-term preservation, obtaining the cardboards like boxes, cases and packages to store the fruits, vegetables and other products and for usage in the light industry, cosmetics and construction industry. Besides, basalt fiber may be used in any technical branch because of their resistance to high temperatures having the output characteristics invariable. For a long time the problem of products' safe keeping is actual for different fields of industry particularly food industry, light industry, cosmetics etc. The problem is in obtaining the stable packing material which would be steady against bacterial, mould, insects, i.e. "biocide"



material. Such material should have the capability to kill bacteria (bactericide), mould fungi (fungicide) and insects (insecticide). One of such material usages is to serve for packing means used for food industry (butter, margarine, meat, fruits, vegetables, eggs etc.) as well as sacks with biocide properties which may be used to store the cereals, flours, groats, sugar and so on to be sure that any pest like rodents or beetles do not make any damage for the product. Different fiber materials have the different resistance to mould fungi spreading.

Literature overview. It is possible to add a little quantity of binding matter (up to 10% of fiber mass) to obtain cardboard-like material from the fiber, it may be used even to increase its strength. It is necessary to apply some corresponding binding materials in case to obtain thin, flexible and thermo-stable output products. Clay materials are well known in this aspect. They consist of silicates with pseudo-hexagonal oriented silicon tetrahedron bound with each other and able to make the spatial coagulation structures with water. Depending of type of structure elements connections and their quantity they may be divided into different types [1]. Clay materials have the ability to make thixotropic structured systems in the suspensions, sorb the gases, liquids and solids on the surface, interact with various materials and affect to their strength and deformation characteristics. It is known [2] that materials containing flax and cotton fiber are less affected by fungi while sulfate cellulose materials are most exposed to this factor. Besides, paper ageing because of environment temperature rising along with humidity increasing (especially these factors concern archives and other special rooms for documents storage) should be taking in a special attention because after time the paper does not only change its color but loses the strength, becomes friable etc. There is a lot of methods to make materials with biocide properties, in some cases biocide matter is entered into paper mass or it is processed into the glutinous press. Depending on output production purposes some acids and their derivatives are used (salicylic, sorbic, derivatives of benzoic acid etc.). It is necessary to follow the emergency rules during this process because all these materials are toxic. Besides, usage of toxic matters must be prohibited for materials used for packing of food products, medicaments, cosmetics



and so on. For those needs we can use the material based on fiber of inorganic nature, for example basalt fiber. It is non-toxic material which may be obtained from practically unlimited world resources. It has high chemical and thermal stability, low heat conductivity and other useful characteristics. There is no problem to obtain cardboard-like material from basalt or other inorganic (glass, ceramic) fiber. Since this material is thin, flexible and firm it requires some binding. So, for this purpose the inorganic, for example basalt fiber in the composition with classic binding, cellulose fiber, may be used.

Output data and methods. In this work we used basalt fiber with diameter of 1,4 mcm and montmorillonite of various formations (Kurts, Cherkassy, Nadia, and Pizhevsk). All of them have high hydrophilic-sorption characteristics and the only difference between the lies in the level of coagulation structures stability which is united to differences in hydrophily, sorption activity, ion-exchange ability etc. The difference in the characteristics may be explained by non-equal ratio of SiO_2 and Al_2O_3 molecules in the formulation, different summary capacity of cation exchange and exchangeable cations' compounds. The usage of surface-active materials produces the significant effect for molecular structure nature and gives the possibility to obtain the systems with desirable mechanical properties, establishes the relation between the system stability and structural-mechanical characteristics of clay suspensions. Having this in mind we used calcium chloride as electrolyte-peptizer.

The following methods of bentonites processing were used: dusted clay samples were put into electrolyte solution of required concentration and kept on the bain-marie for about three hours, then washed out by distillate water and dried up with 200°C for about three hours to obtain the same wages (to extract absorbed water). Then the samples were heated in the muffle furnace at 700°C to remove constitutional water and pores increasing which give more access to mineral pieces difficult to access. In this work we have used cellulose sulfite A-11 and basalt fiber with diameter of 1,4 mcm and aluminium sulfate of the highest purity. We used methods of investigations of fungi resistance and strength characteristics described in the work [3]. Ten types of fungi were used including present and strong cellulose



destroyers: *Stachybotrys atra*, *Paecilomyces varioti* and *Chaetomium globosum*.

Our previous investigations demonstrated that clay minerals with high hydrophilic-sorption characteristics may be used to obtain thin, flexible and thermo-stable material [3]. That's the montmorillonites from various Ukrainian entrails. Found, that the best results give bentonite from Pizhevsk entrails in combination with basalt fiber. Thus we have used the bentonite from this entrails activated by NaOH. It belongs to the class of electrolyte-peptizers. The methods of clay materials preparation are described in the work [3].

Results. Discussion and analysis. We have investigated the effect of processing of clay materials surface by the solution of calcium chloride and the dependence of the ability of coagulated structures creation with necessary structural-mechanical properties as well as finding the interrelations between them and clay suspensions stability. Adding 0,25% of calcium chloride to the suspension we have shift from Ca^{+2} to Na^{+} which gives the effect of plastic robustness, improves the stability and creation of thixotropic structure. The best results were obtained for montmorillonite clay from Pizhevsk entrails (Table 1).

Table 1

The strength of materials containing 85% of basalt fiber and 15% of montmorillonite processed by 0,25% calcium chloride solvation

Temperature	Intermittent Weight, kg			
	Cherkassy	Kurts	Nadia	Pizhevsk
20 ⁰ C	0,30	0,42	0,34	0,44
300 ⁰ C	0,33	0,46	0,38	0,48
500 ⁰ C	0,37	0,50	0,44	0,54

By author

As a rule during the processing the montmorillonite clay minerals go to the fourth structural-mechanical type [3] (except Cherkassy entrails), their stability grows and the viscosity increases. The maximal hardening of coagulate structures of 15% suspensions is reached when 25% calcium chloride is entered. The processing of clay suspensions by calcium chloride has a great effect on coagulation, increases



plastic strength which may be explained by the fact of some particle dispersion during the replacement of sodium ion by calcium ion in clay exchange complex.

As a result, having enough of dispersion phase concentration (up to 15%), suspensions have to irrigable some mutual spirits like this: considerable volume of particle contacts quantity growths which leads to coagulation structure-forming.

All these samples were verified against bio-stability with-up-on various different types of fungi and microorganisms. The investigations were lead at conditions which were acceptable for fungi and microorganisms growth. Methods of stability to fungi is shown in the Table 2. We mark the results by 10- points scale.

Table 2

Bio-stability of material consist of 85%of basalt fiber and 15% of montmorillonite from different entrails processed by electrolyte peptizer of calcium chloride

Mold fungi types	Samples' bio-stability			
	CHERKASSY	KURTS	NADIA	PIZHEVSK
	In the wet camera on the solid phase surface	In the wet camera on the solid phase surface	In the wet camera on the solid phase surface	In the wet camera on the solid phase surface
Chactomium globusum	6/5	5/4	5/4	3/2
Trichoderma lignorum	8/7	8/7	7/6	5/4
Botryotrichum piluliferum	7/7	7/6	6/6	4/4
Chactomium affine	7/6	6/5	7/5	5/3

By author

It is discovered that input of sodium hydroxide into the suspension in the proportion of 0,05 – 0,25% of total mass of dry matter leads to system peptizing (filtration magnitude decreases, plastic tenacity and dynamic plasticity as well). This fact may be explained as exchange cations of montmorillonite are replaced by sodium which leads to system stabilization and shifts the whole system from fives to fourth structural-mechanical type. To obtain composite material consists of up to 30% of sulfite cellulose fiber, up to 70% of basalt fiber and up to 15% of montmorillonite



(according to the total mass) we used 0,05 – 0,25% solution of sodium hydroxide (Table 3).

Table 3

The strength of materials containing basalt and cellulose fibers (20% and 30% respectively) and 15% of montmorillonite (according to fiber mass) processed by various concentration sodium hydroxide solution

	Output basalt fiber (content of cellulose fiber)		Montmorillonite processed by NaOH solution (concentration)	
	20%	30%	0,05%	0,25%
Break, ch.p.p	110	312	128	348
Breaking length, m	160	860	168	914

By author

For investigations of composite materials bio-stability for several fungi and microorganisms types we used methods described in the work [3] where the special attention was given to fungi mix stability, mixes were distinguished from destroyed cellulose fiber because there is an opinion that as a rule during essential destroying of various materials the complex of fungi is progressing instead of single type along with separately some types of fungi which are the most strong destroyers.

Since inorganic basalt finger depress the matter leading to fungi and microorganisms distribution, the affection of samples are considered as a results of bindings action, namely cellulose fiber which supports the physical-mechanical materials' properties providing. The measure of fouling was estimated by sight on ten-degree scale. Maximal affection (10-th rank) corresponds to minimal bio-stability (Table 4).

Conclusions and discussion.

1. Montmorillonites of given entrails obtain better structural-mechanical characteristics after the surface mineralization. Cherkassy montmorillonite differs from others because the process of some disperse is not intrinsic for it very much, tenacity does not vary practically and the process of coagulative structures is weakened having as a result smaller plastic strength.

2. The affection and oppression of examined samples by mould fungi and microorganisms during clay minerals' surfaces processing with electrolyte-peptizers is going down significantly especially in the case of processing by calcium chloride,



for all samples excluding those ones which were taken from Cherkassy entrails. The best results were obtained for samples from Pizhevsk entrails processed with calcium chloride, their anti-bacterial resistance was grown significantly.

3. It is recommended to use bentonite clays (montmorillonite from Pizhevsk entrails of Ukraine) as an additional binding material for basalt fiber processed by sodium hydroxide solution which leads to system peptization, exchange cations replacement by sodium and gives practically totally new system stability (gives system the possibility to change its state to the fourth structural-mechanical type). Maximal peptizing effect is reached by adding 0,25% NaOH.

Table 4

Materials' anti-fungi stability

Mould fungi types	The rate of fungi growth on the materials which contain basalt fiber, cellulose fiber (20% and 30% respectively) and 15% of montmorillonite (according to finger mass) processed by NaOH	
Chaetomium globosum	In the liquid	2
	On solid phase surface	2
	Into wet camera	2
Stachybotrys atra	In the liquid	2
	On solid phase surface	2
	Into wet camera	2
Paecilomyces varioty	In the liquid	2
	On solid phase surface	2
	Into wet camera	2
Fungi mix	In the liquid	2
	On solid phase surface	2
	Into wet camera	3

By author

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Анотація.

У статті описано вплив обробки поверхні глинистого мінералу розчином електроліту кальцію хлориду на формування коагуляційних структур з необхідними структурно-механічними і біоцидними властивостями; вплив дії на поверхню глинистих частинок розчину електроліту-пептизатору натрію гідроксиду на іонообмінні реакції і створення стабільної тиксотропної структури з необхідними фізико-механічними і біоцидними властивостями.

Ключові слова: бентонітові глини, грибостійкість матеріалів, неорганічні волокна, базальтоне волокно.

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Article sent: 22/03/2017 of

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ECONOMY

j12-037

DOI: 10.21893/2227-6920.2017-12.037

IMPROVEMENT OF TRANSPORT CONTROL CARRIED OUT BY CUSTOMS AUTHORITIES AT CHECKPOINTS

d.e.s., prof. Meshechkina R.P. / д.э.н., проф. Мешечкина Р.П.

SPIN 6829-5481

s.p.s., as.prof. Lysova I.I. / к.п.н., доц. Лысова И.И.

SPIN 5004-1708

as. Antonov A.Y. / ас. Антонов А.Ю.

SPIN 4307-7736

*Belgorod University of Cooperation, Economics
and Law, Belgorod, The garden 116 «А», 308023*

*Белгородский университет кооперации, экономики
и права, Белгород, ул. Садовая 116А, 308023*

Abstract. In accordance with the Customs Union's legislation provisions all the goods transported by road in fulfilment of foreign trade operations should undergo the necessary verification procedures at the checkpoint. One of such procedures is the transport control carried out by the customs authorities. The article reveals the main trends in transport control improvement carried out by customs authorities at checkpoints including automation of measurement processes of the vehicles' dimensions and mass, as well as automatic transfer of the received data to appropriate software applied for customs control procedure.

Key words: transport control, automation, software system, technical means of customs control.

Introduction.

One of the most important directions for improving transport control carried out by the customs authorities at checkpoints is the software modification. It is necessary to develop a software tool that could allow just once to enter the weight control results and use them for a quick registration on the arrival announcement. It is



necessary to work out the issues of maintaining a single database of vehicle weight control and connect the “Rubezh” truck scales software with the “APP” software package so that the weight parameters could be automatically entered in the corresponding columns of the instrumental transport control section.

The main text.

Time is one of the criteria according to which the customs bodies' work is evaluated. It takes a considerable amount of time to pass through the checkpoint and it is necessary to reduce the time spent on state control procedure at the Multidirectional Automobile Border Crossing Point, in particular at the transport control stage. At the same time for a foreign trade activity participant time is also of great importance, since for a commercial company all the time expenditures are converted into tangible ones, which, certainly, affects both the goods' final price for the consumer and the competitiveness of products on the domestic market. “Under the conditions of EAEC functioning the foreign trade exchange intensity is increasing, as a result particular relevance and significance of reduction of document circulation, customs operations execution time, acceleration of goods movement across the EAEC customs border is increasing” [1. P. 160]. It is necessary to equip checkpoints with technical means of customs control that could be used for both automatic measurement of overall and weight parameters of cargo vehicles and simultaneous recognition of registration numbers with subsequent automatically data transfer to the appropriate software. A considerable amount of time is spent on carrying out instrumental control in the “manual mode” particularly at the stage of transport control.

Adoption of a customs control technical tool at the Belgorod Customs International Automobile Border-crossing Point “Nekhoteyevka” will allow to automatically measure the overall parameters of freight vehicles (length, height, width, center distance) on the basis of the software and hardware number recognition system and significantly shorten the transaction time in the frames of transport control. “This innovation implementation will significantly reduce the time spent on customs clearance and customs control without having a negative impact on these



events effectiveness” [2, P.489]. Full availability of the necessary soft hardware complex for the customs authority’s activity will also allow to use data of vehicle numbers:

- in case of goods and vehicles movement under the customs procedure of customs transit;
- while filling in a customs declaration for foreign vehicles;
- in the event of the detection of breakers of the Customs Union’s legislation while using the database of not removed foreign vehicles.

Summary and Conclusions.

Thus the main areas for improving transport control are:

- connection of the “Rubezh” truck scales software with the “APP” software package;
- introduction of overall and weight parameters into the automatic measuring system;
- the most complete use of the number identification system.

The specified actions will allow reducing foreign trade activity participants’ costs and simplifying work of customs bodies’ officials at the motor vehicle crossing point.

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Аннотация

Для совершенствования транспортного контроля, осуществляемого таможенными органами в пунктах пропуска, необходима разработка программных средств, позволяющих один раз вписать и постоянно использовать результаты весового контроля, что обеспечит быструю регистрацию сообщения о прибытии.

Сокращение затрат времени на таможенное декларирование перемещаемых через таможенную границу товаров и транспортных средств имеет очень большое значение для участников внешнеэкономической деятельности, поэтому необходимо оборудовать пункты



пропуска техническими средствами таможенного контроля, которые позволяли бы автоматически измерять габаритные и весовые параметры грузовых транспортных средств с одновременным распознаванием номеров, а так же автоматически передавать данную информацию в соответствующие программные средства. Именно на этапе осуществления транспортного контроля затрачивается значительное количество времени на проведение инструментального контроля в «ручном режиме».

Совершенствование транспортного контроля с целью сокращения временных затрат при таможенном декларировании товаров и транспортных средств может быть достигнуто на основе:

- совмещения программного средства весов автомобильных «Рубеж» с комплексом программных средств «АПП»;
- внедрения в работу автоматического комплекса замера габаритных и весовых параметров;
- наиболее полного использования системы распознавания номеров.

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Supervisor: prof. Meshechkina RP

Article sent: 30/03/2017 of

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j12-033

DOI: 10.21893/2227-6920.2017-12.033

FINANCIAL SUPPORT FOR LOCAL AUTHORITIES AS A BASIS FOR COMMUNITY DEVELOPMENT

ФІНАНСОВЕ ЗАБЕЗПЕЧЕННЯ МІСЦЕВОГО САМОВРЯДУВАННЯ ЯК ОСНОВА РОЗВИТКУ ГРОМАД

PhD, senior lecturer Dalievska T.A. / к.е.н., ст.викладач Далєвська Т.А.

ORCID: 0000-0002-2752-1741

Vinnitsa institution of trade and economic KNTEU, Vinnitsa, Soborna 87, 21000

Вінницький торговельно-економічний інститут КНТЕУ, Вінниця, Соборна 87, 21000

Abstract. In this article the economic meaning of financial support for local government is revealed; the role of local authorities is grounded. It is identified the need to strengthen local government financial base. In the article the mechanism of local government financial support is offered. It is revealed that the mechanism of local government financial support consists of the objects, subjects, local financial institutions, methodology of budget planning and forecasting, regulatory and legislative regulation and information provision. The essence of financial support of local government as the part of intergovernmental system and regulator of reproduction processes of administrative units' socio-economic development, based on effective using and increasing territories' fiscal potential, which will strengthen the role of local government and local communities in the budget process, the impact of transformational changes in the economy, is revealed.

Key words: the budgets of local governments, financial support of local government, budget revenues and expenditures, the financial stability of the budget.

Introduction. Economic space of independent local government activities within a certain area creates a system of financial support for local authorities. The local self-government development is impossible without effective functioning of the system of local government financial support, defining the essence of which remains insufficiently explored. At the present stage of Ukrainian budgetary system development it is urgent to improve the mechanism of intergovernmental relations and the role of local governments by creating financial base sufficient to fulfill their

own and delegated powers.

The main text. Local government as a specific form of democracy has constitutional status, is a social phenomenon, a complex political-legal phenomenon and part of the democratization process in Ukraine.[1] The term selfgovernment has English origin. From the XVIII century it was used to determine the specific organization of the social system of England, it's model, which is devoided of external administrative influence. Foreign countries use the terms «local» and «municipality» («munis» from the latin means «burden», «capio» – «accept»).

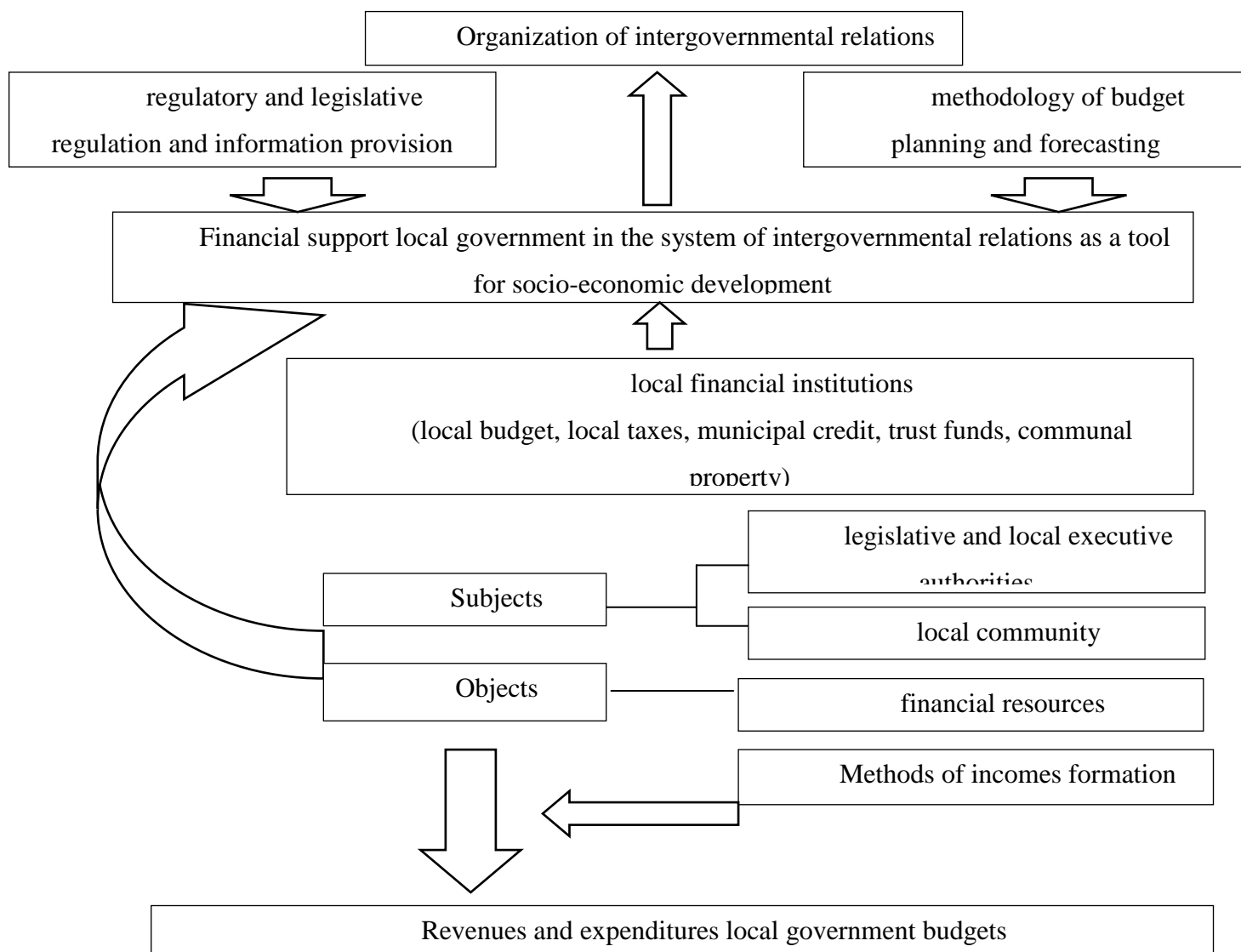


Figure.1. Mechanism of local government financial support

By author

Mechanism of local government financial support in the system of intergovernmental relations as a tool for socio-economic development is described in figure 1. The level of local government independence determines the level of



country's democratic rights and freedoms of local communities, the potential for economic development in general.[2] We propose to disclose the essence of financial support of local government as the part of intergovernmental system and regulator of reproduction processes of administrative units' socio-economic development, based on effective using and increasing territories' fiscal potential, which will strengthen the role of local government and local communities in the budget process, the impact of transformational changes in the economy.

Summary and Conclusions. Were found that financial support for local government plays an important role in the development of local communities.

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Анотація.

В даній статті розкрито економічний зміст системи фінансового забезпечення місцевого самоврядування, обґрунтовано роль місцевої влади у процесі формування місцевих бюджетів. Визначено необхідність посилення фінансової бази місцевого самоврядування. У статті запропонований механізм фінансового забезпечення місцевого самоврядування та виділено такі його складові: об'єкти, суб'єкти, місцеві фінансові інститути, методологія бюджетного планування та прогнозування, нормативно-правове та інформаційне забезпечення бюджетного процесу. Розкрито сутність поняття фінансового забезпечення місцевого самоврядування як складової системи міжбюджетних відносин та регулятора відтворювальних процесів соціально-економічного розвитку адміністративно-територіальних одиниць.

Ключові слова: бюджети місцевого самоврядування, система фінансового забезпечення місцевого самоврядування, доходи та видатки бюджету, фінансова стабільність бюджету.

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Reviewer: Prof. Bondarenko V.M.

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**j12-036****DOI: 10.21893/2227-6920.2017-12.036****UDK 65.01**

**IMPROVEMENT OF THE LABOR PAYMENT SYSTEM AT THE
ENTERPRISE AS A POSSIBLE ACTIVITY INCREASE INCREASE PROFIT
СОВЕРШЕНСТВОВАНИЕ СИСТЕМЫ ОПЛАТЫ ТРУДА НА
ПРЕДПРИЯТИИ КАК ВОЗМОЖНОЕ МЕРОПРИЯТИЕ ПОВЫШЕНИЯ
ПРИБЫЛИ**

Ph.D. Filippova T.A. / к.э.н. Филиппова Т.А.,

Kakovkina O.S., Zugina N.Yu.

Volzhsky Polytechnical Institute (branch) Volgograd State Technical University, 42a Engelsa

Street, Volzhsky, Volgograd Region, 404121

Волжский Политехнический институт (филиал) ВолгГТУ,

Волгоградская обл., г. Волжский, ул. Энгельса, д. 42 А, 404121

Annotation. During the crisis, the most relevant for the employee is material motivation. Therefore, changing the system of material motivation for many companies in a crisis is an important anti-crisis tool [1].

The rational organization of labor remuneration at the enterprise allows to stimulate the results of labor and the activities of its employees, ensure competitiveness in the labor and finished products markets, the necessary profitability and profitability of the products, and accordingly the enterprise as a whole. The goal of a rational organization of labor remuneration is to ensure the correspondence between its value and the labor contribution of an employee to the overall results of the economic activity of the enterprise, i.e., establishing a correspondence between the measure of labor and the measure of consumption.

Keywords: system of payment, enterprise, profit.

Introduction

Differentiation of wages is carried out depending on the complexity, content and performance of workers.

Terms of payment of labor specified in the collective agreement, agreements, local regulatory acts of the organization, as well as the employment contract can not



be worsened in comparison with the established Labor Code, laws and other regulatory legal acts.

In each organization, the following regulatory documents that regulate the terms of payment of labor should be developed:

- a document that establishes the size of the tariff rates of workers;
- schemes of salaries of managers, specialists and other employees;
- Provisions on the current award for main results Activities;
- Regulations on non-recurrent incentives;
- Regulations on allowances and surcharges, etc.

These documents at most enterprises are now merged into one - the Regulations on labor remuneration.

The main text

In the Russian Federation, all the organization's expenses related to wages and other employee benefits are divided into three parts:

- the wage fund, including the amount of payment for the time worked, the amount of payment for the unworked time, compensatory payments related to the condition of work, stimulating surcharges, surcharges, bonuses, housing and fuel;

- social payments reflecting the costs associated with

With social benefits, except for benefits from state off-budget funds;

- expenses not taken into account in the payroll and benefits fund

Social character.

The wage fund is the amount of remuneration provided to hired workers in accordance with the quantity and quality of their work, as well as compensation related to working conditions. The payroll fund is a source of funds intended for payment of wages and social benefits.

Salaries are divided into basic and additional.

Under the basic salary understand the following: pay for time worked, for the quantity and quality of work performed, additional payments due to deviations from normal working conditions, payment of downtime not through the fault of the employee, bonuses, premium supplements, etc.



The additional salary includes payments for the time not worked out, stipulated by the labor legislation and collective agreements: payment of time of vacation, time of performance of state and public duties, preferential hours of adolescents, severance pay at the dismissal of others.

The maximum amount of remuneration for employees is not limited at present. In the amount of the minimum wage, surcharges, payments, for work in conditions deviating from normal wages, for work in special climatic conditions and in territories exposed to radioactive contamination, as well as other compensatory and social payments are included. In accordance with Art. 133 of the Labor Code of the Russian Federation, the minimum wage can not be lower than the subsistence minimum.

The main task of the organization of remuneration of labor is to put the labor payment in dependence on the time worked and the quality of the labor contribution of each employee, and thereby increase the stimulating function of the contribution of each employee.

The organization of labor remuneration in the enterprise is determined by three interrelated and interdependent elements: the tariff system, the standardization of labor, as well as the forms and systems of labor remuneration that should be optimally suited to the specifics of the enterprise's activities.

Consider a possible replacement of the traditional wage system, which would benefit both the employee and the employer - the trading company.

The first motivational charge instead of salary can be selected percentage of the proceeds. Also, additional rewards can be introduced: a bonus for attracting new customers and a bonus for the number of sales. It is necessary for this purpose to develop a scale of values by the number of primary and secondary transactions. Since the task of attracting new customers has become more complicated than under normal conditions, the bonus for attracting new customers can be quite high - from 1,000 to 9,000 rubles.

The bonus for the number of sales will take into account the number of transactions with previously attracted customers, it is less significant than the



indicator on attracting new customers. Thus, the amount of remuneration can vary in smaller amounts, from 500 to 4,500 rubles.

Due to the means of automation, it will be possible to reduce the labor intensity of the new motivational scheme. The values of performance indicators will automatically be formed in the regular manner in the process of work of managers.

Summary and Conclusions

Thus, the analysis of economic activity has an important role in improving the organization of wages, ensuring its direct dependence on the quantity and quality of labor, the final production results and the economic development of the enterprise as a whole. In the process of analyzing the existing system of labor remuneration at the enterprise, reserves should be identified to create the necessary resources for growth and improvement of labor, introduce progressive forms of labor remuneration for workers, systematic control over the measure of labor and consumption, as the growth of wages is not correlated and incommensurable with the growth of labor productivity. Will lead to a decrease in motivation and incentives for staff, and the enterprise itself will reduce profits [2, 3].

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Аннотация.

В период кризиса наиболее актуальной для работника является материальная мотивация. Поэтому изменение системы материальной мотивации для многих компаний в кризис - это важный антикризисный инструмент [1].

Рациональная организация оплаты труда на предприятии позволяет стимулировать



результаты труда и деятельность его работников, обеспечивать конкурентоспособность на рынках труда и готовой продукции, необходимую рентабельность и прибыльность продукции, а соответственно и самого предприятия в целом. Целью рациональной организации оплаты труда является обеспечение соответствия между его величиной и трудовым вкладом работника в общие результаты хозяйственной деятельности предприятия, т. е. установление соответствия между мерой труда и мерой потребления.

Организация оплаты труда на предприятии определяется тремя взаимосвязанными и взаимозависимыми элементами: тарифной системой, нормированием труда, а также формами и системами оплаты труда, которые должны оптимально подходить специфике деятельности предприятия.

Ключевые слова: система оплаты труда, предприятие, прибыль.

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j12-044

DOI: 10.21893/2227-6920.2017-12.044

EFFECTS OF GREEN MARKETING STRATEGY**ON FIRM PERFORMANCE****ВЛИЯНИЕ СТРАТЕГИИ ЗЕЛЕНОГО МАРКЕТИНГА НА****ЭФФЕКТИВНОСТЬ ДЕЯТЕЛЬНОСТИ ПРЕДПРИЯТИЯ****PhD, as.prof. Mykhailiuk N.S. / к.э.н., доц. Михайлюк Н.С.**

ORCID: 0000-0002-5226-8151

Chernigiv National Technological University, Chernigiv, Shevchenka 95, 14000

Черниговский национальный технологический университет, ул. Шевченка 95, 14000

Abstract. In this paper we study the effects of green marketing strategy on the firms' performance. The paper aims at presenting the reviews of the literature on the green marketing and analyses the four factors that will influence the firms' performance. As green marketing strategy become increasingly more important to firms adhering to a triple-bottom line performance evaluation, the present paper seeks to better understand the role of "green marketing mix" as a marketing strategy. The conclusion that was drawn is that, green product, price, distribution and promotion have a positive effect on the firms' performance.

Key words: green marketing strategy, firm performance.

Introduction. As the competitive landscape is being drastically changed by the increasing concern toward environmental sustainability, firms are beginning to determine how the adoption of "green" marketing practices can benefit or harm their performance [12]. The increasing sensitivity of the public, strictness of regulations, and amount of pressure from stakeholders have driven professionals to consider "green" issues in their corporate decisions [10, 12]. Environmental products and services, such as green vehicles, have also attracted increasing attention from customers [11, 13]. However, although corporate managers are beginning to include such issues in their agenda, the sustainability of their marketing strategies has been insufficiently documented in empirical studies [5]. Therefore, the effects of adopting environmental marketing practices remain relatively unknown among the managers and policy makers of contemporary firms [4].

The main text. Green marketing mix, which denotes a set of marketing tools



and elements, allows a firm to serve the target market and achieve organizational goals without harming the natural environment [1]. At the same time, it facilitates product sales. Active involvement in environmental protection motivates family and friends to purchase green products, thus furthering the sustainable development in the country.

The hypothesized model linking the relationship between Green marketing strategy includes green product, green price, green promotion, green distribution, with firm performance.

Green products emanate from product-related decisions and actions that aim to preserve or benefit the natural environment through energy and/or resource conservation as well as pollution and waste reduction. Both strategic and tactical approaches may be involved in such undertakings. The process of packaging and labeling products in an environmentally friendly manner is a tactical challenge several firms face. For instance, in France, Hewlett-Packard addressed this challenge by selling its laptops in a readymade carrying case, thus reducing the use of disposables packaging for laptops by 97% [3].

The practices of green pricing consider both the economic and environmental costs of production and marketing, while simultaneously providing value for customers and a fair profit for business. From the tactical perspective, firms can undertake pricing actions, such as rebates for returning recyclable packaging and charging higher prices for environmentally unfriendly products. For instance, CocaCola established a “recycle bank” as a form of rewarding U.S. customers for their bottle-recycling efforts. In the United Kingdom, retailer Marks & Spencer encourages the use of environmentally friendly shopping bags by charging customers for plastic carrier bags [3].

Green distribution denotes the selection of channels in a manner that minimizes environmental damage. Most of the damages to the environment occur during the transportation of goods. Hence, firms must implement safety precautions on the delivery of products [2].

From the strategic perspective, firms can use green promotion tactics to



communicate the environmental benefits of their goods and services, such as advertising environmental claims, publicizing environmental efforts, and integrating environmental claims into product packaging. For instance, to communicate the environmental impact of its products, Timberland introduced a green index rating system [13].

Performance is a critical concern for companies. The major drivers of firm performance are resources that are unique, invaluable, and difficult to imitate and replace [9]. Excellent firm performance is likewise at the core of competitive advantage. A number of scholars provide similar definitions of performance, but their criteria for measuring performance vary. Therefore, the research topic of a study should determine the performance measurement index to be used [7].

Summary and Conclusions. This paper extensively reviews the literature in the field of green marketing mix and highlights that Firms that adopt green marketing strategy are expected to generate more profits than those firms that do not adopt such strategies.

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Аннотация. В данной статье было изучено влияние стратегии зеленого маркетинга на работу предприятия. Цель статьи – проанализировать научные труды посвященные вопросам зеленого маркетинга и выявить факторы, которые будут влиять на работу предприятия. Поскольку экологическая маркетинговая стратегия становится все более важной для предприятий, придерживающихся оценки производительности в три этапа, данная статья направлена на то, чтобы лучше понять роль «зеленого маркетинга» в качестве маркетинговой стратегии. Проведенный анализ показал, что зеленый продукт, цена, распределение и продвижение позитивно влияют на работу предприятий.

Ключевые слова: «зеленая» маркетинговая стратегия, эффективность фирмы.

Article sent: 31/03/2017 of

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j12-032

DOI: 10.21893/2227-6920.2017-12.032

**APPLICATION OF K. ZAMFIER'S METHODS IN THE MODIFICATION
OF A. REAN TO ASSESS MOTIVATION OF EMPLOYEES OF
INDUSTRIAL ENTERPRISES OF ULYANOVSK REGION
ПРИМЕНЕНИЕ МЕТОДОВ К. ЗАМФИРА В МОДИФИКАЦИИ А.
РЕАНА ДЛЯ ОЦЕНКИ МОТИВАЦИИ СОТРУДНИКОВ
ПРОМЫШЛЕННЫХ ПРЕДПРИЯТИЙ УЛЬЯНОВСКОЙ ОБЛАСТИ**

с.е.с., Ryabova M.A./ к.э.н. Рябова М.А.

Ulyanovsk State Pedagogical University

University named after INUlyanov

Ульяновский государственный педагогический университет,

Россия, г. Ульяновск, пл. Ленина, д104

Abstract: *The article contains a study of the motivation of workers of industrial enterprises of the Ulyanovsk region on the model "Motivation of professional activity (methodology K. Zamfir in the modification of A. Rean), which is used to diagnose the motivation of professional activity. The results of the evaluation of the effectiveness of various types of motivation of workers in industrial enterprises are presented, which determines the motivational complex of the individual.*

Keywords: *motivation of professional activity; intangible incentives; system of intangible incentives; diagnostics of motivation; motivational factor; internal and external motivation.*

For formation of effective system of stimulation of work workers necessary to analyze the motivation of their professional activities.

A comprehensive study of motivation of professional activity of 35 workers was conducted anonymously at one of the industrial enterprises of the Ulyanovsk region. For the study of motivation of professional activity of workers was used the technique "Motivation of professional activity (the technique by K. Zamfir in modification by A. Rean)". [4]



This technique is used for diagnostics of motivation of professional activity. It is based on the concept of internal and external motivation. About the internal motivation to say, when a person has the value of the activity itself. If the basis of motivation of professional activities lies the desire to satisfy other needs that are external to the content of the activity itself (the motives of social prestige, salaries, etc.), in this case we speak of external motivation. [2]

Themselves external motives differenziata on the outer positive and outer negative. External positive motives, of course, more effective and more desirable from all points of view, than the external negative motives.

Using the technique by K. Zamfir determines the effectiveness of the following types of motivation: monetary income; a desire for career promotion; the desire not to be subjected to criticism from Manager and colleagues; the desire to avoid possible punishment or trouble; focus on prestige and respect from others; satisfaction from a job well done; social usefulness of labor. [5]

For the analysis of the responses used the following scale:

- 1 point – "very small extent",
- 2 points – "quite minor",
- 3 points – "not great, but not to a small extent",
- 4 points – "enough",
- 5 points – "very large extent".

Calculated indicators of intrinsic motivation (VM), external positive (ILM) and outer is negative (PTO) in accordance with the keys. Indicator of severity of each type of motivation is the number enclosed in the range from 1 to 5 (including the possibly fractional).

On the basis of the obtained results is determined by the motivational complex personality, the type of correlation between three types of motivation: VM, VPM and PTO. BM, BIIM и BOM.

For the best, the optimal, incentive systems should include the following two types of combinations: $VM > VPM > PTO$ and $VM = VPM > PTO$. The worst motivational complex is a type of $PTO > VPM > VM$.



Main results of survey of workers of industrial enterprises of the Ulyanovsk region are presented in tables 1 and 2. [3]

Table 1.

The compliance of respondents, the specific motivational complex

M o t I V a t I o n n s t h o m p l e					Number of respondents
VM	>	VPM	>	PTO	35,48%
<i>VM</i>	=	<i>VPM</i>	>	<i>PTO</i>	0 %
VM	<	VPM	>	PTO	12,9 %
<i>VM</i>	<	<i>VPM</i>	<	<i>PTO</i>	9,68%
VM	>	PTO	>	VPM	25,8%
<i>VM</i>	=	<i>VPM</i>	<	<i>PTO</i>	0 %
VM	>	VPM	=	PTO	6,45%
<i>VM</i>	=	<i>VPM</i>	=	<i>PTO</i>	0 %
<i>PTO</i>	>	<i>VM</i>	>	<i>VPM</i>	9,68%

Note to table 1:
 VM – internal motivation;;
 VPM – external positive motivation;
 PTO – external negative motivation;
Bold – the best motivational complex (the balance of motives);
Italics indicated – the worst motivational complex.

Analysis of the results showed that, choosing between the best, optimal and the worst types of ratios, the majority of workers chose the optimal complex represented by combinations:

$$VM > VPM > PTO (35,48\%)$$

This suggests that workers with data motivational complexes are involved in the professional activity for its own sake and not for rewards and external recognition. This activity is an end in itself rather than a means to achieve some other purpose. It professionals, which attracts interest to the process, they tend to choose a more challenging task, which positively affects the development of their professional and qualification characteristics and helps to enhance cognitive prozessberatung whose motivational system is characterized by a predominance of external motivation, was 32,25% of respondents (12.9% of external positive motivation, and of 19.35% from external negative motivation).

The worst motivational complexes represented by the following ratio:



PTO>VPM>VM; PTO>VPM=VM;

PTO>VM>VPM; PTO=ILM=WM.

These complexes for a combined total of 19.36% of total surveyed workers. This may indicate indifference, and, perhaps, a negative attitude to the labor process as a whole.

Table 2.

The identification of the predominant type of motivation

The predominant type of motivation	Number (%)
VM (internal motivation)	67,74% (21)
VPM (external positive motivation)	12,91 % (4)
PTO (external negative motivation)	19,35 % (6)

Extrinsic motivation is the use of the method of "stick and carrot" (encouragement, stimulation, criticism, punishment) or formula behaviorism (B. Skinner, K. Hull, etc.) S - R (stimulus - response), the introduction of competition began, etc. The main elements in this type of motivation are external incentives - leverage or the carriers of "irritations" that trigger the action of certain reasons. [1]

As can be seen from table 1, the motivational complex of the employment team looks like VM > VPM > PTO. But the performance of these types of motivation differ from each other slightly.

Describing the group as a whole, we can conclude that the predominant type of motivation for labor activity of surveyed industrial workers of the Ulyanovsk region, is intrinsic motivation this type of motivation is characteristic 67,74 % of workers.

In second place – employees with an external negative motivation (of 19.35 %). The work of specialists with this type of motivation is characterized by the following signs: the work for the work itself, without pleasure from the activity or without interest; work for fear of failure; work under duress or under pressure etc. In third place workers with external positive motivation (12.9 %). This type of motivation "worse" type of motivation because if it workers are attracted to not the activity itself, but how it will be appreciated by others (positive evaluation, promotion, praise, etc.).



[3]

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Аннотация

Статья содержит исследование мотивации работников промышленных предприятий Ульяновской области по модели «Мотивация профессиональной деятельности (методика К.Замфир в модификации А. Реана)», которая используется для диагностики мотивации профессиональной деятельности. Представлены результаты оценки эффективности различных типов мотивации работников промышленных предприятий, что определяет мотивационный комплекс личности.

Ключевые слова: мотивации профессиональной деятельности; нематериальные стимулы; система нематериального стимулирования; диагностика мотивации; мотивационный фактор; внутренняя и внешняя мотивация.

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**j12-077****DOI: 10.21893/2227-6920.2017-12.077****FEATURES OF INNOVATIVE DEVELOPMENT AT THE REGIONAL LEVEL (THE THEORY AND PRACTICE OF MANAGEMENT, KALUGA REGION, RUSSIAN FEDERATION)****Doctor of economic Sciences Kruglov V. N.***Institute of management, business and technology, Kaluga, Gagarina, 1, Russia 248000***Доктор экономических наук Круглов В.Н.***Институт менеджмента, бизнеса и технологий, Калуга, Гагарина, 1, Россия, 248000*

Abstract. The article studies the factors of the possible use of innovative tools in the industrial sector of different regions. Hypothetical projected growth from innovation. Are considered the main vectors and paradigms of the movement. Given the findings and recommendations.

Key words: Investment, innovation, region, economy, the dynamics of growth, territorial development, provision of resources, tools, models.

Introduction.

Kaluga region has considerable experience with the implementation of new industrial policy, which is based on attracting to the region of large corporations. The system itself is based on the principle of cluster development.

Kaluga business learn how to effectively integrate into the chain interaction with international corporations, to conduct their own policies and to build a development strategy without resorting to cooperation with major foreign capital. In this regard, it is logical to transition Kaluga region economy, primarily aimed at the defence industry sector to a diversified model [1, S. 145].

The main text.

Kaluga industrial enterprises developed under the motto: "Develop your company, interact with partners, but maintains independence." The experience of industrial development in the region – collaboration, partnership and competition between Kaluga enterprises in the industrial sector with foreign companies, who came to the local area, tempered, small and medium business of the region and learn to live in these conditions [2, p. 16]. At the same time need the continued support of the process at all levels.



The first level – the Federal level (economy): programme of development of Russian industry for 10 years. Industrial enterprise is a resource that defines the economy of Russia. Therefore, the active attitude of the authorities to stimulate the development of priority sectors of industry allows you to create a real competitive environment.

The state takes an active position on issues of import substitution, production development and support of small and medium enterprises (SMEs). Federal law No. 488-FZ "On industrial policy". It facilitates access to debt funding for small and medium businesses, reduce the minimum size of loans. For this project we created and actively working the industry development Fund, which is one of the best institutions of development in Russia to date [3, p. 317].

Second level – regional (policy). It includes developing practical measures that can enhance the processes of modernization and implementation of innovative technologies in the production process. This algorithm considers the prospects of production from the point of view of strategic management.

The third level is the set of activities focuses on how to improve the competitiveness of products and services of the Kaluga enterprises. The companies must be able to obtain updated knowledge and skills to implement their innovative projects.

From these positions rather interesting experience this innovative regional companies as CJSC "Energomash".

But the quality here is used not to save. The quality management system ISO 9001 applied in the company for more than 10 years. Service quality is one of the largest in the state. It provides incoming inspection of components, multi-output control of finished products and analysis of external and internal defects. Such a serious approach allows to provide two-year quality guarantee all products meet the most stringent standards adopted in the automobile industry.

There are three major groups of regular customers of the firm.

The first group of OEM customers. It's plants that manufacture vehicles, specialty vehicles, marine and motorcycle equipment, generators, and various



General industrial equipment, where applicable low voltage components. For these customers made a large number of products according to their specifications. The production time of samples may be only a few days. Orders are manufacturing from 100 pieces per year.

The second group is a major distributor throughout Russia and the CIS. They supply products under three own brands: "Energomash", "Comitatoelettorale" and Vasch.

The third group – end buyers, such as small services, a variety of shops, fleet companies and individuals. Specifically to serve this category three years ago it created a separate entity – the Internet-shop of "12V", where you can individually buy products and related products.

Large assortment, high quality and low price make products popular in the market of automotive components.

Summary and Conclusions.

Innovation can be called almost all the products of the company. For twenty years the firm offers clients a more modern and reliable products than the competition. Analogues a range of products not only in Russia but also in the world. For example, this block applies a series of indicators, in the design of automotive relays.

And this is the surest pledge to innovation, both within individual firms and within the whole region.

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Аннотация.

В статье исследованы факторы возможного применения инновационных инструментов в промышленном секторе различных регионов. Гипотетический прогнозируемого роста от инноваций. Рассматриваются основные векторы и парадигмы движения. Даны выводы и рекомендации.

Ключевые слова Инвестиции, инновации, регион, экономика, динамика роста, территориальное развитие, ресурсное обеспечение, инструменты, модели.

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Article sent: 29/03/2017 of

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j12-078

DOI: 10.21893/2227-6920.2017-12.078

Діденко Ю.Ю.

**FUNDED SYSTEM OF COMPULSORY STATE PENSION INSURANCE:
SOCIAL AND ECONOMIC CONSEQUENCES OF INTRODUCTION
НАКОПИЧУВАЛЬНА СИСТЕМА ЗАГАЛЬНООБОВ'ЯЗКОВОГО
ДЕРЖАВНОГО ПЕНСІЙНОГО СТРАХУВАННЯ: СОЦІАЛЬНІ ТА
ЕКОНОМІЧНІ НАСЛІДКИ ЗАПРОВАДЖЕННЯ**

с.е.с., as.prof. Didenko Y.Y. / к.е.н., доц. Діденко Ю.Ю.

ORCID: 0000-0000-7825-3022

*National Aerospace University named after M. E. Zhukovsky «KhAI», Kharkiv,**Chkalova 17, 61070**Національний аерокосмічний університет ім. М.Є. Жуковського «ХАІ»,**Харьков, ул. Чкалова 17, 61070*

Abstract. The work is devoted to the investigations of social and economic consequences while reforming the pension system through the implementation of cumulative (funded) level.

Peculiarities and problems of existing pension system are explored, such as an unprecedented decline in living standards of the majority of the population, reduction of state and society revenues and the age of retirement.

The model for calculating the pension savings and benefits which is elaborated in the work provides a basis for the targeted formalized analysis of pension provision with quantitative assessment of certain socio-economic parameters' impact.

Calculations made using economic and mathematical modeling allow to estimate the effects of the pension reform for different sections of the population through the introduction of cumulative (funded) level of pension system.

Possibility of finding the solutions for existing gender issues in a multi-level pension system is substantiated (the difference in salary levels, the use of maternity leave by women, the setting of an earlier retirement age for women).

Key words: pension provision, savings, pensions, cumulative level, funded



pension system.

Introduction.

The pension system in each country is one of the most important components of social security. The organizational legal form of the pension system depends on the condition of the economy and labor market, tax policy and policy on income, demographics, development of fiscal institutions including insurance ones.

At the same time, we can not ignore the fact that the scrutiny level of the social and economic aspects of the pension system in Ukraine lags behind current needs of national practice. It does not allow responding quickly to the enquiries of practice as well as making appreciable decisions on the numerous pressing problems of the pension system development.

1. Problems of pension system in Ukraine

The pension system established in Ukraine on the basis of the Law in 1991 has depleted the possibilities of its development approximately in the mid 90's and began to demand its permanent “fit” to the changing conditions of economic and social life.

Identified causes and consequences of the crisis in the pension system in Ukraine prove the need for deep reforming of pension provision. However, it should be noted that the difficulties experienced by the pension system, and, naturally, by people who take part in it, can not be attributed entirely to the defects that are in pension legislation based on joint-distribution scheme. Many, if not most, pension problems should and can be resolved without a radical change in the pension system because the pension reform envisages the creation of infrastructure of the pension system, modification of the distribution model of pension provision and effective functioning of the cumulative (funded) component of the pension system.

The main goal of pension reform should be to strengthen the social security of people who became disabled, to provide a decent standard of their living based on balancing the interests of workers and pensioners [1].

Nowadays, there are such social issues as chronic deep crisis of social production, with all its negative consequences, sharp unprecedented decline in living standards of the majority of population, reduction of state and society income, and



hence drop of possibilities for the rapid correction of the economic situation, inability of optimal and responsible distribution of what society still has at its disposal; all these issues are supplemented to the existing imperfections of the pension system itself. [2].

In the transition to a market economy, the retirement age problem is influenced by two contradictory factors and becomes highly complex and controversial.

While substantiating the directions for the pension reform in Ukraine the focus has been made on macro-economic and demographic calculations. However, such rationale is not enough because it does not take into account the characteristics of the pension system as a part of the social system.

2. Development and rationale for the model of cumulative (funded) level of pension system

The fundamental point of cumulative (funded) system is that the amount of retirement pension, which a worker will receive, is closely connected in time with the value of his pension contributions, retirement age and residual lifetime. It is therefore important to conduct additional calculations that will forecast the effects of pension reform for different part of population, different by their positions in the area of employment and in the labor market as well as by their social roles.

In order to consider the social consequences of the pension system's reform and to analyze the influence of the main factors which determine the characteristics of the employment positions of men and women in the labor market, gender stereotypes existed in our society, as well as the influence on the pensions of different socio-demographic groups, we developed a model using the method of mathematical modeling that allows us to estimate the impact of interruptions in the labor activity (both community service and the forced ones), as well as the existing asymmetry in employment for pension payments. As a result of the modelling we were able to evaluate these payments for men and women belonging to different socio-demographic groups.

Forecasting of pension provision process related to the interests of its individual member was examined as socioeconomic and consisting of two separate phases:



accumulation of funds for the individual pension account, pension payments. To study the accumulation of funds for the individual pension account we analyzed well-known pension schemes [3]. In our case, we made all calculations for funded (cumulative) pension scheme with defined contributions.

All calculations were performed on the example of one age class, whose whole career will last during the operation of the cumulative system; this is the example of those people who will begin their labor activity after the start of pension reform. This is because people of older age class will participate in the new pension system with special transitional rules.

That is why the possible differentiation in modelling the pensionable service between men and women was formed with considering the following:

- the maximum possible length of service, the duration of which in our calculations equals 43 years for men and women (from 17 to 60 years old) or 48 years (from 17 to 65 years old) if an increase in retirement age;
- the duration of study at the institute (17-22 years old);
- the duration of absence at work connected with family responsibilities of an employer (such as maternity leave or vacation for child care);
- military service (18-19 years old).

For the most plausible accommodation of childcare vacations in the timeline, we used the data of demographic statistics about the average interval between successive births of children depending on the total number of births women have [4] and the data on the average age of women give birth to their first child. Vacation for childcare is now 3 years. In the model, we used the data and rounded them with the accuracy up to one year. Thus, the following data were used in the calculations: age of woman giving birth and periods of maternity leave to care for children: the first child – mother's age 23, leave from 23 to 26 years old; the second child at 27 years, leave from 27 to 30 [5].

It was assumed that during these breaks a person is not working, not receiving a salary and does not make pension contributions.

Calculations were carried out for three career options: pessimistic means that wage growth (pension contributions) of the employee during working life is solely due to inflation, the other two variants (expected and optimistic) the increase in salary



(pension contributions) of the employee is influenced by two factors: inflation and his rising career. Optimistic option provides that only at the expense of his/her career the employee increases his/her initial wage 3 times. For the "average" or an expected career options, this indicator equals 2.

Also in our work during the modelling we used the value of the interest rate for employee's pension contributions at the level of 7 (average value based on the data from different countries); we suggested that during the working life of the employee, it remains unchanged, so the story the employee's salary and the story of his/her pension contributions can be described with one dependence.

Actual annual net rate of return equal to $i = 6\%$, and average annual inflation - $j = 5\%$, the indicators are fixed at the level accepted in international practice under the conditions of long-term actuarial calculations.

3. Socio-economic characteristics of reforming and conditions for development of funded pension insurance in Ukraine

Analyzing the question of whether it will be enough money to pay pensions from funded system, and according to the data of the model constructed, excluding the coefficient that increases wages depending on the level of education, we can say that the break related to studies at the institute, can reduce employee retirement amount by 23-40%. It should be noted that retirement savings of a woman will make up to 70% of pension savings of a man with the same level of education due to gender differences in salaries.

Increasing the retirement age by 5 years (up to 65 years) will increase the amount of pension savings by 45-47%.

Having normalized the retirement savings of women by the importance of pension savings of a woman with the lowest level of education (at the level of secondary school) and by the most unfavorable trajectory of wage's growth and at the same time retirement savings of men by the value of pension savings of a man also with the lowest education level and pessimistic trajectory wage growth, we see that if men and women do not have other interruptions in the labor activity except related to the education, the pension savings for men can be increased by 1,4-2,9 times (in



different career variants), while for women by 1.5 times in terms of pessimistic career and 1.9 times in terms of optimistic one.

Calculations also showed that the birth of a child and care for him/her for three years reduces retirement savings for women by 6-9% compared to a woman who does not have children or did not use maternity leave. The same data can be obtained if childcare leave is used by a man. The birth of two children and the use of two maternity leaves by women reduces the amount of their savings by 11-19%.

If to compare the retirement savings of a man and a woman with the same education level, but consider here that a woman has a child and fully used childcare leave, then, as calculations show, her retirement savings will be at the level of 64-70% of a man's savings. If a woman has two children and used two childcare vacations, then - 59-63%.

In the modelling of pension benefits' the increase for benefits was anticipated at the expense of interest on the balance of the accumulated amount.

However, the amount of pension benefits for men and women will be differentiated even more than the amount of savings, and the indicator that will influence is a factor of death [6]. In Ukraine the current difference is 10 years between the life expectancy for women (76 years) and men (66 years), it leads to the fact that the pension amount of a woman is less than a third of man's pension benefit. The calculated data for men, provided the retirement at 60 years old and pension payments for 6 years, show that military service reduces the amount of their future pension in average by 5%, if the same level of education. If a man uses childcare leave, the level of his pension will decrease by 7-10% according to various forecasts. The ratio of pension amount of those who has secondary education and those with higher education is 0.7. This confirms the assumption that higher wage allows to accumulate more money even provided less period of payment.

According to the calculated data, we can conclude that the increase of retirement age for women by five years increases the amount of their pensions by 40% depending on their level of education and number of children, and if a woman retires at age 65 the amount of pension will be twice lower than for a man. The use of



childcare leave reduces woman's pension by 7-10%, provided the same level of education. If there are two childcare leaves, the level of pension will decrease by 17% according to various forecasts.

Summary and Conclusions.

The calculations made, in our opinion, quite eloquently show the discrepancy of pension reform, on the one hand, with the arrangements of demographic, education and defense policies - on the other. The degree of this inconsistency is so great that it can not be ignored. One of the solutions to the problem may be providing certain, shall we say, "retirement compensation" to employees who perform socially useful work (unpaid) or have forced interruption in employment [7].

Also we believe it is necessary to pay attention to the determination of pension as a share of wage for various categories of workers (low and high earnings) [8].

Generally, it is possible to say that funded pension system is more consistent with the principles of market economy than the distribution system. That is why the introduction of compulsory funded pension scheme is possible only after the establishment of the necessary economic conditions and after the creation of well-coordinated and effective system of state supervision and regulations in this area.

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Аннотация.

Введение. Работа посвящена исследованию социально-экономических последствий при реформировании пенсионной системы путем внедрения накопительного уровня.

Основной текст. Исследуются особенности и проблемы существующей пенсионной системы. В качестве таковых рассматриваются беспрецедентное падение уровня жизни большинства населения, сокращение доходов государства и общества, возраст выхода на пенсию.

Разработанная в работе модель расчета пенсионных накоплений и выплат дает основание для целенаправленного формализованного анализа пенсионного обеспечения с количественной оценкой влияния отдельных социально-экономических параметров.

Выполненные расчеты с помощью экономико-математического моделирования позволяют оценить последствия реформирования пенсионного обеспечения для различных слоев населения путем внедрения накопительного уровня пенсионной системы.

Выводы. Обоснована возможность решения в многоуровневой системе пенсионного обеспечения существующих гендерных проблем (разница в уровнях заработной платы, использование женщинами отпуска по уходу за ребенком, установление более раннего возраста выхода на пенсию для женщин).

Ключевые слова: пенсионное обеспечение, накопления, пенсионные выплаты, накопительный уровень, пенсионная система.

Article sent: 15/02/2017 of

© Didenko Yuliia



j12-079

DOI: 10.21893/2227-6920.2017-12.079

УДК: 657

**PECULIARITIES OF USING ELECTRONIC REPORTING:
ADVANTAGES AND DISADVANTAGES
ОСОБЛИВОСТІ ВИКОРИСТАННЯ ЕЛЕКТРОННОЇ ЗВІТНОСТІ:
ПЕРЕВАГИ ТА НЕДОЛІКИ**

Garna S.O., Shnyrko A., Fedorov A.A. /

Гарна С.О., Шнурко А.М., Федоров А.А.

State higher educational establishment

“Donbass state teachers training university”

Slovansk, 19 General Batyuk street, 84116

Державний вищий навчальний заклад

“Донбаський державний педагогічний університет”

м. Слов'янськ, вул. Батюка, 19, 84116

Abstract. The article presented the modern state of using the electronic reporting in Ukraine as an obligatory for all business entities. In the result of the conducted study the main advantages of transmission the reporting using the developed programs on the Internet are highlighted, the advantages and disadvantages of using the electronic reporting are defined.

Key words: financial reporting, electronic reporting, taxpayer, electronic document, information technologies, electronic keys.

Анотація У статті розглянуто сучасний стан використання електронної звітності в Україні як обов'язкової для всіх суб'єктів господарювання. В результаті проведеного дослідження виділено основні переваги передачі звітності за допомогою розроблених програм в мережі Інтернет, визначені переваги і недоліки використання електронної звітності.

Ключові слова: фінансова звітність, електронна звітність, платник податків, електронний документ, інформаційні технології, електронні ключі.

Introduction. The final stage of the accounting process of the company is reporting, which must meet the requirements of the Law of Ukraine “On Accounting



and Financial Reporting in Ukraine” [1], Regulations (Standards) of Accounting and other regulatory legal acts. In order to simplify the procedure for the compiling, filing and further processing of the reporting it has been introduced the electronic reporting, the main provisions of which are set out in the Law of Ukraine “On Electronic Documents and Electronic Document Circulation” [5]. The ways of the tax filing defined by the requirements of p. 49.3 of Art. 49 of Chapter II of the Tax Code of Ukraine [4] provide for the submission of the declarations, statements both in the paper form and in the electronic form.

After the adoption of the Tax Code of Ukraine the individual elements of e-taxation have gained their further legal development, although a number of problems that slow down the application of the electronic reporting still remain unresolved.

The aim of writing this article is to highlight the real prospects and opportunities of filing the e-taxation reporting and search for the ways to optimize it based on the existing tax base in Ukraine and the international experience of the economically developed countries.

The main text. In order to simplify the procedure for giving and further processing defined by the applicable regulatory documents types of the reporting the electronic reporting has been introduced. Over the past years, the state in the sphere of taxation creates the thorough legislation base that would provide the opportunity for taxpayers to form and submit their reporting electronically.

Filing the tax reporting electronically can reduce paper document circulation, shorten overheads and simplify the procedure of the reporting. In addition, the electronic reporting is also the prestige of the organization or enterprise which working with use of the modern information technologies, shows to the public his honest position of the conscientious taxpayer.

The following bodies take the electronic reporting: the State Tax Administration of Ukraine; the Pension Fund of Ukraine; the State Statistics Committee of Ukraine; the State Employment Center and other bodies.

Filing the electronic reporting means that the reporting will be formed using a special computer program, signed by the keys of the digital signature and loaded in a



file of specific format, which then needs sending by the email and receiving a response from the relevant bodies about the acceptance [6].

For filing the electronic reporting it is required special software with the help of which electronic documents can be created and submitted. The Tax Service of Ukraine provides the free program of OPZ- “Tax Reporting” for the formation of the tax reporting. The tax reporting can also be fulfilled using the commercial accounting programs. With the help of this program one can create any tax report, save it in the desired format and print. After that the electronic signatures is imposed on the document, it is carried its encryption and it is sent to the tax authorities by e-mail.

The electronic digital signature is superimposed using the private key and is verified using the open key. For its legal status it is equivalent to a handwritten signature (seal). The electronic digital signature as a means to control the origin and integrity of information is an effective tool for information security.

Ukraine is planning as soon as possible to introduce the paperless reporting to all the public authorities. For that the Government has approved the Concept of creation and functioning of the automated system “Single Window of Filing the Electronic Reporting”.

The purpose of creating the automated system “Single Window of Filing the Electronic Reporting” is streamlining the mechanisms of electronic interaction of the controlling state authorities and entities of filing the reporting through the introduction of the common uniformed standards for the filing process, processing, using and storing the reporting, adequate regulatory - legal, methodological, organizational and technological provision of the interaction of the participants of filing the electronic reporting.

The main advantages of filing the tax reporting and registers of tax invoices in the electronic form are: saving the time of taxpayers and their funds to purchase the forms of accounting documents (there is no need to go to the state tax office, to buy reporting forms); guarantee of the automatic verification of the prepared documents for the presence of arithmetic errors and misprints; possibility of automatic updating the formats of filing documents electronically by the telecommunication channels;



significant reduction of the time of the audit on the legality of the sums of VAT claimed for reimbursement and provision of their timely reimbursement to the taxpayer; proof of the delivery of the reporting (the tax authority sends a receipt about obtaining the tax returns by the telecommunication channels); confidentiality of information; operability of processing the received information at the tax authority; the reporting that sent to the tax authority by e-mail via the Internet using the enhanced certificate keys of the digital signature does not need duplicating in the paper format and storing it [3].

However, there are problematic aspects and factors that slow popularization of the electronic tax reporting and adversely affect the implementation of the electronic reporting, these include: high requirements for professionals that makes the computerized reporting; costs of purchasing and maintenance of computer programs, preparation of the electronic reporting and acquisition of the proper computer equipment; the cost of staff training; psychological persistence of accountants and managers of enterprises; temporary complication of the procedure of preparing and filing the electronic reporting due to the need to get and to agree the keys of the digital electronic signature with external users; inconsistency and imperfection of the legislation on the electronic document circulation; instability of the legislation on the financial accounting and reporting, that does not allow to provide timely automated calculation of certain forms of the reporting.

The impact of the part of these factors can significantly be reduced and eliminated if managers and accountants of enterprises get comprehensive information about the benefits of filing the electronic reporting, the full list of actions for the transition to the electronic reporting and the cost of software [3].

Summary and Conclusions. The conducted studies have established that in order to improve the relations between the tax authorities and taxpayers in Ukraine the state creates the maximum opportunities for filing the electronic tax reporting. Filing the tax reporting electronically has many advantages for both taxpayers and tax authorities.

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Article sent: 23/12/2016 of

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LEGAL AND POLITICAL SCIENCE

j12-045

DOI: 10.21893/2227-6920.2017-12.045

УДК 347.918.1

REASONS OF REFORMING OF THE ARBITRATION COURTS

ПРИЧИНЫ РЕФОРМИРОВАНИЯ ТРЕТЕЙСКИХ СУДОВ

Cand.Jur.Sci., associate professor Kukina Tatyana/ К.ю.н, доц. Т.Е.Кукина

VSSPU "The Volgograd state social and pedagogical university", Volgograd, Lenin Ave. 27,

400131

ФГБОУ ВО «Волгоградский государственный социально-педагогический университет»,

Волгоград, Ленина 27, 400131

Abstract. In the article the author carries out comparison of Judicial reform of 1864 and reform of arbitration process of 2016 from positions of their reasons, the purposes, tasks, functions, extent of realization, practical usefulness and the importance for public life. The author analyzes the concepts "legalized" and "voluntary" arbitration courts, gives historical analogies, considers intermediate results of reforming of the arbitration courts in modern Russia.

Key words: reform, arbitration process, principles, intermediary, arbitrator, judicial charter, objectivity, independence

As the reason of any reforming always serves any discontent with the current situation in branch or the sphere of public life. In the 19th century that were served by fundamental criticism of all judicial system of the Russian Empire which one of statesmen and Alexander I's teacher – Frédéric César Lagarp – has expressed in the following remark: "Your legal proceedings – real Dedal, and only slanders, tricks and bribes help to get out of this labyrinth". It was the first attempt to create the state arbitration courts. The secretary of state count D. N. Bludov in a note to the draft of the Charter of civil legal proceedings (further – UGS) has paid attention that "our resolutions on the arbitration court are traced in the 1831st year, under visible effect of foreign legislations and in particular the French process". During the same period also history of the Russian arbitration courts changes – by drawing up the draft of the



Charter of civil legal proceedings opinions of representatives of commercial courts on activity of the arbitration legalized court have been considered. At that time understood a type of arbitration legal proceedings where a form of process, candidates for judges and execution of decisions were strictly controlled by the state as the legalized court and were provided with a measure of the state coercion. Collected opinions were uniformly negative: the community has opposed the state arbitration courts, demanding to leave only courts voluntary and to simplify procedures of consideration of arbitration disputes. There have passed 150 years and the Russian legislator has decided to return to a subject of creation of the state and controlled arbitration courts. Drafts of the acts drafted in common by the Ministry of Justice of the Russian Federation and the MEDT of the Russian Federation which general essence was briefly and laconically expressed by authors of article posted on the official site of Federal arbitration courts of the Russian Federation became a result of similar reflections. "The arbitration courts and commercial arbitration will transform to NPO, will frighten arbitrators criminal liability, and to the state courts will add the controlling functions - such innovations can shortly wait for arbitration trial in Russia". According to O. Fomichev, independence of the state doesn't mean yet that the state can't carry out control and supervising functions concerning the arbitration courts. The main difficulty in implementation of objectives comes down to the fact that at introduction of control over in fact autonomous system of the arbitration courts all this system threatens to turn into one more branch of the state judicial. Thus, despite time difference and the generalized experience of lawmaking accumulated for centuries, the reasons which have induced the legislator to reforms of the arbitration courts are identical.

Conclusion and conclusions.

Modern to us reform of arbitration process goes on the way of nationalization (some kind of nationalization) of the centers of alternative consideration of disputes. In essence, it is about a reconstruction of the legalized arbitration courts.

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Аннотация. В настоящей статье автор проводит сравнение Судебной реформы 1864 года и реформы третейского процесса 2016 года с позиций их причин, целей, задач, функций, степени реализации, практической полезности и значимости для общественной жизни. Автор анализирует понятия «узаконенные» и «добровольные» третейский суды, приводит исторические аналогии, рассматривает промежуточные итоги реформирования третейских судов в современной России.

Ключевые слова: реформа, третейский процесс, принципы, посредник, арбитр, судебный устав, объективность, независимость.

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Article sent: 30/03/2017 of

©Kukina Tatyana

**j12-046****DOI: 10.21893/2227-6920.2017-12.046****УДК 347.918.1**

THE REFORM OF A PROCEDURAL FORM OF ARBITRATION PROCESS
РЕФОРМА ПРОЦЕССУАЛЬНОЙ ФОРМЫ ТРЕТЕЙСКОГО
СУДОПРОИЗВОДСТВА

Cand.Jur.Sci., associate professor Kukina Tatyana/ К.ю.н, доц. Т.Е.Кукина

*VSSPU "The Volgograd state social and pedagogical university", Volgograd, Lenin Ave. 27,
400131*

*ФГБОУ ВО «Волгоградский государственный социально-педагогический университет»,
Волгоград, Ленина 27, 400131*

Abstract. In the article the author carries out the comparative analysis of a procedural form of arbitration legal proceedings reform of 2016, reveals shortcomings and advantages of both procedural forms, points to the reasons which induced the legislator to change of the legislation on the arbitration courts analyzes need of legislative short stories.

Key words: reform, arbitration process, principles, intermediary, arbitrator, judicial charter, objectivity, independence

Today, one of urgent problems is the methodological analysis of legislative work in the field of reforming of activity of the arbitration courts.

An opportunity to solve business rather, than in places judicial has to be property of the arbitration court. "Difficult forms" as they were called in those days, interfered with development of the arbitration court and "as though have been established to reject from the peaceful agreement. And inconvenient also increased requirements to arbitration record were considered heavy. In the legalized courts check of arbitration record quite often occupied the main part of procedural term of consideration of the case. Therefore developers of the new Judicial Charter of 1864 have found necessary to lower requirements to arbitration record – we full authority is granted are required to make record at their discretion with certification in court, either at the notary, or by means of a private condition, and for recognition of valid it



only of the signature of the agreeing persons without any other ceremonies. The legislator has even established that lack of stamped paper isn't considered an obstacle for the conclusion of the arbitration reservation. Arbitration record could be issued on simple paper, with the indication of minimum necessary data: surnames their intermediaries and subject of a dispute. Other data were considered as facultatively optional and joined in record only by agreement of the parties. Process had to happen in the conditions of simplicity and clearness of the events for the parties. Article 1379 UGS assumed that the parties or will establish an order of consideration of a dispute in arbitration record, or intermediaries (arbitrators) consider case "without any special ceremonies and formalities". I eat less arbitration court it will be constrained by those strict formalities which are necessary in vessels of the general: he will be more available to those, production of it will be easier for those; and as the arbitration court solves business on conscience, especially would be inappropriate to limit to any special formalities free will of contracting parties on which discretion depends as providing business to consideration and the decision of intermediaries, and establishment of an order by which it has to be made. Contemporaries of reform of 1864 have stated the most successful and laconic expressions for the formulation of simplicity of arbitration process words of the Roman lawyers - sine strepitu forensic-without excess judicial roar. Reform of the arbitration courts in 2014 provides also change of procedural features of consideration of disputes. First, it is about long ago the position of designation of the arbitration court, known and offensive for legal community, as "services". Respectively, in article 40 of the Project is narrated not about justice implementation, and about requirements imposed to execution of services. Therefore, all procedural form of arbitration legal proceedings ("uslugoproizvodstvo") has to correspond to the legal nature of this object of the civil rights. By successful definition of Yu.Kh.Kalmykov, service – it is active, the service is the activity directed to creation of conveniences or granting privileges to on obligations legal relationship. Connection of the principle of judicial (arbitration) impartiality with most-favored-nation principle is represented absolutely incompetent to the client. Secondly, article 40 of the bill formulates procedural features of



consideration of a dispute according to the legal nature of services. The similar position of the legislator can be observed in the regulations devoted to bases of tourist activity, providing medical services, estimated services. "The order of carrying out arbitration provided by rules of permanent arbitration establishment has to provide: an order and the procedure of presentation of the statement of claim and a response on the claim; hearings and (or) trial of business on the basis of written documents; bases and order of stay and termination of arbitration trial; order and terms of removal, registration and direction of the arbitral award; order of correction, interpretation, addition of the arbitral award; power of the parties and the arbitration court regarding definition of an order of arbitration trial and a circle of questions concerning which deviation from rules of arbitration trial or their specification by conclusion of agreement of the parties and/or the procedural act of the arbitration court isn't allowed.

Conclusion and conclusions.

Modern to us reform of arbitration process goes on the way of nationalization (some kind of nationalization) of the centers of alternative consideration of disputes. From this it is possible to conclude that the bill intends to toughen a procedural form of arbitration legal proceedings as much as possible: services have to be rendered in the framework which is strictly determined by the law; intentions, the rights and desires of the parties, including desire of the fastest consideration of a dispute, aren't taken into account.

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Аннотация. В настоящей статье автор проводит сравнительный анализ процессуальной формы третейского судопроизводства по реформе 1864 года и реформе 2016 года, выявляет недостатки и достоинства обеих процессуальных форм, указывает на причины, побудившие законодателя к изменению законодательства о третейских судах, анализирует необходимость законодательных новелл.

Ключевые слова: реформа, третейский процесс, принципы, посредник, арбитр, судебный устав, объективность, независимость.

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Article sent: 30/03/2017 of

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**j12-047****DOI: 10.21893/2227-6920.2017-12.047****УДК 347.918.1****REFORMING OF ARBITRATION JURISDICTION AND PROCEDURAL
TERMS****РЕФОРМИРОВАНИЕ ТРЕТЕЙСКОЙ ПОДСУДНОСТИ И
ПРОЦЕССУАЛЬНЫХ СРОКОВ****Cand.Jur.Sci., associate professor Kukina Tatyana/ К.ю.н, доц. Т.Е.Кукина***VSSPU "The Volgograd state social and pedagogical university", Volgograd, Lenin Ave. 27,
400131**ФГБОУ ВО «Волгоградский государственный социально-педагогический университет»,
Волгоград, Ленина 27, 400131*

Abstract. In the present article the author carries out comparison of arbitration jurisdiction and reform of the arbitration courts. Besides, concepts of competence of the arbitration courts, its types are analyzed, the concepts "competences competence" are investigated, the analysis of requirements which are imposed to arbitration judges is carried out. At the end of article the author draws conclusions about the happening reform of the arbitration courts in Russia.

Key words: reform, arbitration process, principles, intermediary, arbitrator, judicial charter, objectivity, independence

The maximum terms of consideration of arbitration affairs aren't specified in the bill of reform of 2016. The conditional analysis of an order of the choice of judges (article 11 of the project speaks about appointment of judges) gives the chance to assume about the uncertain and long nature of procedural legal relationship. 150 years ago authors of Aleksandrovsky judicial reform have come to a consensus that the term of arbitration trial has to be the shortest. The parties are, without participation of public authorities or court, choose intermediaries (article 1367), and appoint the term of consideration of the case (Art. 1372). The maximum (preclusive) term of consideration of the case was established in 4 months. Disputes trade ... aren't suffered the slightest delay; in this sort of affairs any stop in the movement of



court can cause or accelerate ruin.

Reform arbitration process was based on a bit different principles of a statement of arbitration competence: the legislator in detail specified category of affairs, jurisdictional to the arbitration court. It was possible to mark out territorial, patrimonial, subject competence. Treated territorial: I have put bashkirets and others Ufa of the people (1734); affairs of low-Russians (1734); on affairs, in lands of Donskago's army (1804); on affairs of the Nogais and other Mohammedans wandering in the Caucasian area (1827). Treated patrimonial jurisdiction: customs affairs (1727); affairs of competitions with obligees and debtors of competitive mass (1800); I have put drinkable farmers with attendants on payoffs (1802); affairs of the insurance companies and companies (1827, 1835, 1838); I have put all in general the companies on actions (1836) and disputes over privileges (1833). Treated subject jurisdiction: affairs of peasants of palace department; persons of mountain department and other estates. Zaytsev A. I. has very successfully analysed history of jurisdiction of arbitration affairs., having specified that reforming of competence went on forward development: from adoption of highly specialized diplomas before generalization (systematization or codification) them in separate regulations (Charters). Authors of modern reform of arbitration process are between 1831 and at the crossroads 1864. The bill comprises two approaches to a statement of competence of the arbitration court. On the one hand, paragraphs 5 and 6 of article 1 of the project formulate the general private-law competence of the arbitration court; on the other hand, the legislator hasn't kept and began to list in article 7 of the project concrete types of legal relationship, jurisdictional to arbitration process: clearing operations; the disputes following from activity of the organized auction; corporate disputes; a little tangled also disputes from contracts of accession (item 8 of Art. 7 of the project) are uncertainly specified. It is difficult to call similar structure logical or systematized, or simply - system. The charter of civil legal proceedings of 1864 didn't contain requirements to arbitration judges – opposite, D.N.Bludova it was specified in the explanatory note of the count about need of simplification of position of intermediaries (arbitrators), "that they didn't act under the influence of prejudices or



fear". Intermediaries were elected by the parties, and among themselves chose "umpire", "the senior by litas". The fee wasn't paid for consideration of disputes. Other situation develops with arbitration reform of 2016. After the numerous debate authors of the bill of arbitration reform of 2016 have decided to refuse a condition about special criminal liability of judges (arbitrators). The main requirements to arbitrators have remained the same. Most of them have been established in article 11 of the project, including: 7. If the parties haven't concluded the direct agreement on other, the arbitrator resolving a dispute individually, and in case of joint settlement of dispute the chairman of structure of arbitration has to correspond to one of the following requirements: 1. met the higher legal education confirmed with the diploma of the established sample issued in the territory of the Russian Federation; 2. met the higher legal education or qualification supported by the documents of the foreign states on education level and (or) qualification recognized in the territory of the Russian Federation; 3. met the qualification entering the list of the qualifications providing the right for conducting legal practice in the foreign states, approved by the Ministry of Justice of the Russian Federation.

Among short stories of arbitration reform during her discussion it was offered to include in structure of the arbitration courts of the former judges liquidated by the Russian Federation. The Resolution of the Constitutional Court of the Russian Federation No. 30-P of November 18, 2014 became the real event in life of arbitration community. Devoted to questions of a possibility of creation of the corporate arbitration courts, the text of the resolution, at the same time, contains important statements of judges of the Constitutional Court about requirements which judicial authority imposes to arbitration judges. The first requirement – to independence of the judge (arbitrator) which means absence labor (the worker-employer, the chief-subordinate), civil (debtor creditor) and other legal relationship (administrative, financial, family, etc.) between the judge and the party in process. The second requirement – to impartiality of the judge (arbitrator) – is analyzed through a prism of such categories as the outlook, the moral principles caused by the reasons of psychological or intellectual character the situational relation to one of the



parties of a dispute. The third requirement – the accounting of organizational and legal communications of the judge (arbitrator) with the parties of a dispute. It is obvious that intermediate results of arbitration reform allow to speak about serious changes at this institute of civil society.

Conclusion and conclusions.

It is accepted to speak about forward, evolutionary, development of history: from initial forms of statehood to progressive models of public life.

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Аннотация. В настоящей статье автор проводит сравнение третейской подсудности по судебной реформе, происходящей в 2016 году. Кроме этого, анализируются понятия компетенции третейских судов, ее видов, исследуются понятия «компетенции-компетенции», проводится анализ требований, которые предъявляются к третейским судьям. В конце статьи автор делает выводы о происходящей реформе третейских судов в России.

Ключевые слова: реформа, третейский процесс, принципы, посредник, арбитр, судебный устав, объективность, независимость.

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Scientific journal

SWORLDJOURNAL

Issue №12
March 2017

Development of the original layout - "Scientific World"

Signed in print: 30.04.2017

SCIENTIFIC WORLD
153012, Ivanovo, ul.Sadovaya 3, 317
E-mail: orgcom@sworld.education
www.sworld.education

Identifier of the subject of the publishing business №9906509

*The publisher is not responsible for the reliability of the
information and scientific results presented in the articles*

