

**Ministry of Education and Science of Ukraine
Zhytomyr State Technological University
Ivan Franko Zhytomyr State University
Zhytomyr Military Institute named after S.P. Korolov
Zhytomyr Medical Institute**



***“Current Trends
in Young Scientists’ Research”***

V All Ukrainian Scientific and Practical Conference

Book of Papers

April 12, 2018



Zhytomyr

V All Ukrainian Scientific and Practical Conference
“*Current Trends in Young Scientists’ Research*”

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Session work №1

CURRENT RESEARCH IN THE FIELD OF ENGINEERING SCIENCES

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DETERMINATION OF THE LOCATION OF RADIO EMISSION SOURCE FROM A SPACECRAFT

Nowadays our Motherland actually takes part in warfare in the east of Ukraine. That is why it is extremely important to provide Ukrainian Armed Forces with up to date operational intelligence information about the location of the enemy. An important part of carrying out the combat missions is the means of electronic security, such as radiocommunication, radiolocation, radionavigation etc. For instance, means for detecting the flight path of enemy missiles and mines are based on the use of radar systems (RS). To detect a target, the radar system emits a signal of a given frequency. It determines the direction and distance to the target relatively to the radar. In order to do that, RS analyzes the parameters of the reflected signals from the target. Means of radionavigation and radiocommunication also fulfill their tasks by using radio waves. If enemy's RS emits radio signal (i.e. radio waves), it is possible to determine its location and destroy this RS (especially if it is used to navigate missiles).

The Ukrainian government supports the development of aerospace industrial complex. That is why Ukraine has its own space program. This program provides increasing of the efficiency of space exploration facilities, which can perform monitoring tasks by examining the earth's surface from spacecraft in the radio range, despite the time of the day and meteorological conditions.

If an object located on the earth's surface emits a radio signal, spacecraft receiver's input will get another signal frequency. It will differ from the frequency of the object, by a value that depends on the movement of the spacecraft relatively to the radar system. This frequency increment is called the Doppler frequency. After

measuring the frequency of the signal, it is possible to determine the law of changing the Doppler frequency on the interval of observation. This interval has to be divided into two parts. By integrating the Doppler frequency change equation, it is needed to determine the difference of the range from the source of the radioemission at the beginning and at the end of those two parts of the interval. Therefore, we have two differences in ranges and the law of the movement of spacecraft. With the help of it, it is possible to determine the coordinates of the position of the radar system on the earth's surface.

The results of the simulation showed that at a flight altitude of 650 km, the accuracy of the location of a radar station that emits a signal at a frequency of 3 GHz is no more than 3 km, with a distance between the radar and the spacecraft to 1000 km.

Thus, this method provides estimating the position of the source of radioemission from a spacecraft when the location of the radar station and its signal parameters are unknown. It should be noted that the accuracy of the location of the RS depends on the precision of the measurement of the Doppler frequency at the interval of observation. It is extremely complicated to proceed the perfect measurement. The difficulty is that there may be occasional changes in the frequency of the device, distorting the result of the measurement of the Doppler frequency.

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WASTE TREATMENT AT MINING AND STONE PROCESSING ENTERPRISES IN ZHYTOMYR REGION

Ukraine has about 4% of world deposits of decorative stone and considerable part of them is located in Zhytomyr region.

Utilization and waste treatment of stone-mining and stone-processing enterprises has always been important not only in Ukraine but in the whole world. As far as

Zhytomyr region is located on Ukrainian Crystalline Massif it is rich in different mineral deposits. Mining process generates a large amount of waste. Thus, our region needs solution to this problem. Most enterprises do not conduct waste treatment. Waste can be put in dumps, even in forests or other places. Such activity causes environment pollution and destroys farmlands.

Besides, material resources in the Earth are limited and cannot renew in the period compared with the period of humanity existence. It means that except environment pollution there is one more important problem, i.e. the problem of resources exhaustibility.

Processing granite, gabbro or labradorite produces more than 60 hundred m³ of solid mineral waste; stone slurry makes up almost 50 hundred m³ after stone cutting and polishing. It is connected with the amount of dimension stone extracted from massif. Good quality dimension stone makes up less than 40%. Thus, more than 60 % of stone is not used and goes to dump. But the major part of stone waste can be treated and used for making building materials. For example, bigger parts of debris can be used for making tiles and other facing products. Small parts can be crushed by mobile or half-stationary crusher to make gravel. Crushed material can be used as concrete or ballast for construction of buildings and roads. Gabbro and labradorite have worse physics mechanical characteristics, but such material can also be used for making gravel. Its quality is a bit worse compared to granite gravel, but it can be used as a construction material, which does not require excessive strength, e.g: as a ballast, and for construction of not very high buildings in a temperate climate. At the same time the price for these materials will be much lower, because it will not include expenses for mining. Slurry can be used like raw material for making paving stone blocks and tiles. Research evidenced that after slurry was used the hardness of concrete has increased up to 40 %.

Thereby, it is possible to solve the problem with unutilized resources, environmental pollution, and obtain new source of raw materials.

UDC 622.3

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ESTIMATION OF TREATMENT EFFICIENCY OF NATURAL CLADDING STONE SURFACES BY MECHANICAL AND CHEMICAL METHODS

The advance of science does not stand still. Its pre-conditions are related to the growth of consumer requirements to the products. So, the new methods of treatment of natural cladding stone appear in the stone processing industry. The influence of chemical and mechanical treatment of natural cladding stone on its lightness and

brilliance was studied on the example of Pokostivsky granodiorite, and also the problem of management of natural stone lightness was solved. The mechanical methods of treatment of natural stone were fully investigated, namely, the forming of microstructure of rockforming minerals was investigated by means of microscopy and spectral analysis. Depending on the roughness of the stone surface, the change of brilliance of its surface was studied. In relation to chemical treatment, the influence of different coloured pigments on brilliance and colors of carbonate rocks (marble, limestone) was studied. **The aim of the work** is an estimation of treatment efficiency of natural cladding stone by mechanical and chemical methods. **The tasks** are: 1) to define the indexes of surface brilliance of natural cladding stone treated by mechanical and chemical methods; 2) to define the indexes of surface lightness of natural cladding stone treated by mechanical and chemical methods; 3) to define the indexes of surface saturation of natural cladding stone treated by mechanical and chemical methods. **35 samples** from the following types of natural cladding stone (5 samples of each of 7 types of stone) were used: Pokostivsky granodiorite, Bukivsky gabbro, Golovynsky labradorite, Mezhyritsky granite, Kapustynsky granite, Zhadkivsky granite, Leznikivsky granite. A flat-grinding machine was used for their **mechanical** treatment. For **chemical** treatment of the surface of natural cladding stone were used the following impregnating means: 1. means for the impregnation of Tenax Easywet, on the basis of varnish, that gives the effect of wet stone to the surface and is used for treatment of surface of all types of natural stone for protecting from moisture, oil, fat and for color strengthening; 2. transparent crystallizer - Kristalizer, on the basis of solution of silicates with a beeswax that is used for the improvement of brilliance and chromaticity of all types of stone; 3. black crystallizer - Gabbro+ for products from the natural stone such as: granite, gabbro, labradorite. This means deeply penetrates and closes pores, microcracks, protecting a stone from destruction. It strengthens and satiates the color of stone and gives it a delicate brilliance; 4. red crystallizer - Leznik, on the basis of solution of silicates with red pigments for products from a natural stone (red tints). **The method of estimation of treatment efficiency of the surface of natural cladding stone by mechanical and chemical methods** involves the use of digital images of samples and implementation of their treatment by the facilities of the modern computing engineering. The methodology of determination of **colors of natural cladding stone** is as follows: 1) the samples of stone with sizes 10×20cm are taken; 2) the samples are cleaned and their surfaces are scanned; 3) the received image is worked over; the middle indexes of lightness (L) and colour coordinates are determined; 4) the indexes of saturation of S are determined by converting of the received average color coordinates. The methodology of **determination of surface brilliance** of stone involves the use of measuring means (glossmeter). The methodology of determination of surface brilliance of natural cladding stone is as follows: 1) the samples are cleaned from dust, dirt and other substances; 2) the device is calibrated according to the standard; 3) brilliance is measured in 6 different points of the sample; 4) average brilliance indicators of the stone surface are determined for each sample. **To estimate the treatment efficiency of the surfaces of natural cladding stone by mechanical and chemical methods**, it is necessary at first to define the average brilliance of its

surface. After determining the brilliance of polished and sawn samples of stones, the chemical impregnating means are used between the process of impregnation and the process of reading of indicators. The diagram of the **polished surface** of natural stone shows that at the chemical treatment on the different types of natural stone brilliance increases. The diagram of the **sawn surface** of natural stone shows that at the chemical treatment on the different types of natural stone brilliance increases. An important constituent at the determination of decorativeness of natural cladding stone is objective determination of its color descriptions. A color is characterized according to next basic signs: by color tone, saturation and brightness. Having studied a sawn surface we obtained the following data: sawn samples have greater brightness than the polished samples at mechanical treatment, and at chemical - saturation and brightness of the treated surface of natural cladding stone change considerably. As a result of the study, it is possible to draw a conclusion, that each of the chemical impregnating means influences differently on the decorative indexes of the surface of natural cladding stone. They increase brilliance, darken the stone, they can both improve and worsen its saturation. Depending on the type of the used means, the saturation of the stone both increased and decreased. Efficiency of their use depends on mineralogical composition of natural stone.

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ACOUSTIC SYSTEM WITH SUBWOOFER

Nowadays, audio players that reproduce the sound from a magnetic tape are not in use. Personal computers reproduce the sound of much higher quality. Moreover, the advantage of a personal computer system is a huge number of music that can be stored in a computer memory. High-quality sound is also required for games and movies that can be viewed from a CD. Only a high-quality acoustic stereo system, which is divided into several bands, with a subwoofer can effectively and spatially reproduce the sound.

The requirements for sound quality of musical compositions and the various sound effects used in films and computer games are increasing. Very few people are satisfied with the sound amplifiers of the past generation. The amplification of sound in such devices was mainly carried out on several transistor cascades. The large mass of elements through which the sound signal passes, by its nature introduces a certain level of noise and peculiar amplitude-frequency distortion. In this case very low and very high frequencies are impossible to reproduce. They are simply lost when passing the amplifying path.

The development of active acoustic system with a subwoofer is currently a topical task.

The solution to this problem is as follows. The audio signal must be divided into ranges. It is necessary to amplify the signal independently between the right and left channels and the ranges using analog circuits. Though microcircuits are more expensive than transistors, they have the advantage of excellent quality, sound clarity and small overall dimensions. For high-quality playback of the lowest frequencies it is advisable to use a subwoofer, the so-called low frequency amplifier.

Usually 2-5 main speakers and one subwoofer are used. Only one subwoofer is used because a human ear does not take the direction of the low frequency wavelength. The wavelength is much greater than the distance between the ears and the phase difference between the right and left ear is minimal and it can be neglected. Therefore, the sound from the right and left channels can be reduced to one and given to the subwoofer.

As an example, we can remember so-called cinema "Multiplex", that is popular in Zhytomyr. It looks like a renovated usual cinema with the usual cinema projector, which was used in the past. So, why is it so expensive to watch a movie there? The reason is in the sound. Due to the skillful arrangement of a certain number of loudspeakers with a certain turnaround, they achieve a complete reproduction of sound. If the screen shows the car approaching from the right, then the sound is heard from the right side as well. Besides, this acoustic system can not do without subwoofers, because it's impossible to reproduce the noise of cars, the buzzing of aircraft engines and other equipment, with normal quality loudspeakers. The described system of sound reproduction creates the so-called effect of "presence".

The acoustic system with a subwoofer can be used at home as well. The subwoofer provides the highest quality and completeness of the reproduced sound. This work shows the order of system development and gives examples of work with the system. The issues on system design and reliability of its work are considered. The ways of improving the control through the WiFi mechanism and the expediency of using dual speaker systems or a possible replacement for three or four band speakers are regarded.

The principles and technologies of realization of the device basic characteristics are researched. The dependence of audio quality on the parameters of the sound paths elements and characteristics of the basic units is determined. The ways of the device improvement are analyzed. Options for the construction on the basis of microcontrollers and FPGAs are considered, as well as program adjustment of channel parameters and their number, taking into account the features of the room configuration.

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DEFINING THE SURFACE OF CUT WHILE GRADUAL FRONT-END MILLING IN THE ENVIRONMENT OF SOLIDWORKS MOTION

For end mills with step-by-step cutting patterns and non-cutting cutting edges, the task of determining the cut-off area is difficult, so it remains unresolved. It is impossible to measure the cut-off area directly because of the shrinkage, therefore it is proposed to solve this task by simulating the simulation in SolidWorks Motion environment.

For simulation, a solid-state collective model of a stepped mill cutter and workpiece has been developed (Fig. 1). Adaptation of the model to determine the cutting area was to repay the parts of the assembly that were not important (in terms of analysis) and to replace them with new conjugations to determine the required reciprocal position of the elements

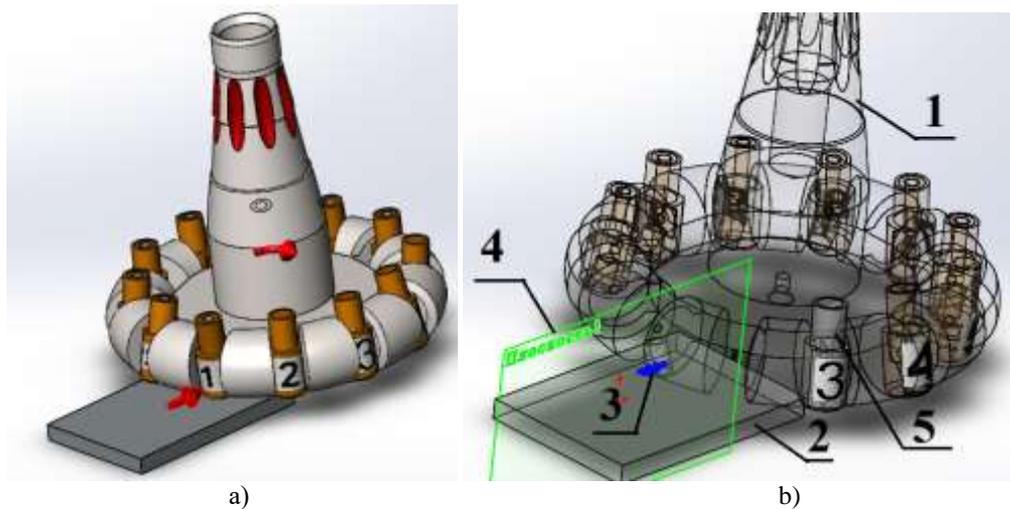


Fig.1 The general view of the simulation model (a) and the creation of a sketch in the context of the assembly (b):

1 - cutter; 2 - workpiece; 3 - sketch of projection of cutting edges; 4 - auxiliary plane; 5 - cutting element with an individual number

The imitation of the mutual movement of the workpiece and cutter was realized by two engines: linear (simulating the supply of the workpiece) and rotary (simulating the rotation of the milling cutters). The linear motor speed was 1.33 mm / s (which corresponds to the feed supply $s = 80$ mm / min); The rotational speed of the linear engine was 200 rpm. In the parameters of motion research, 1500 frames per second was set at 0.15 seconds (the time for which the cutter makes half a turn).

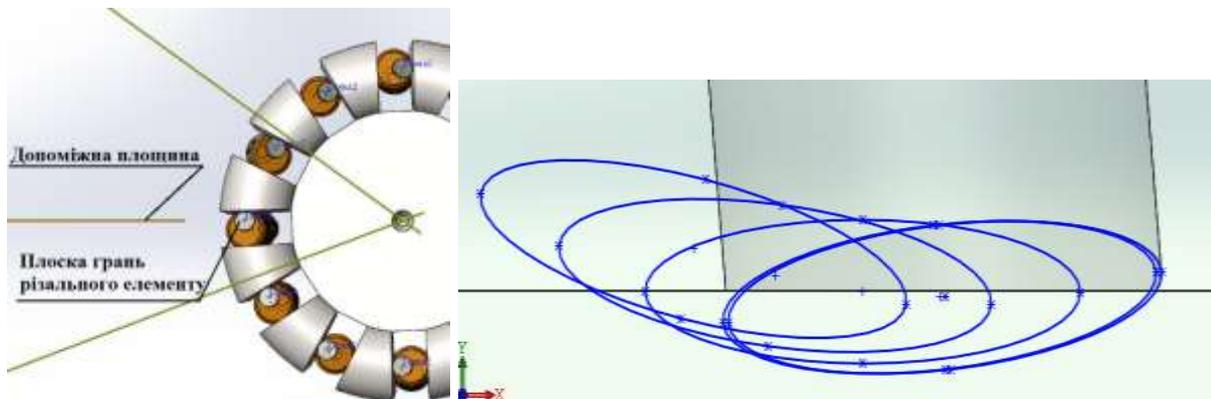
To change the display attributes of the assembly components, the key points on the Motion Manager timeline were used (timeline-based interface). At the same time, with the help of key points on the MotionManager scale, the exact time was set (the minimum possible move of key points is 10^{-9} seconds) stop motion animation to build a sketch.

At the time of the study, when the plane centres face the cutting element alternately coincide with the auxiliary plane (Fig. 2, a), the projections of the cutting edges on the auxiliary planes were created (Fig. 2, b).

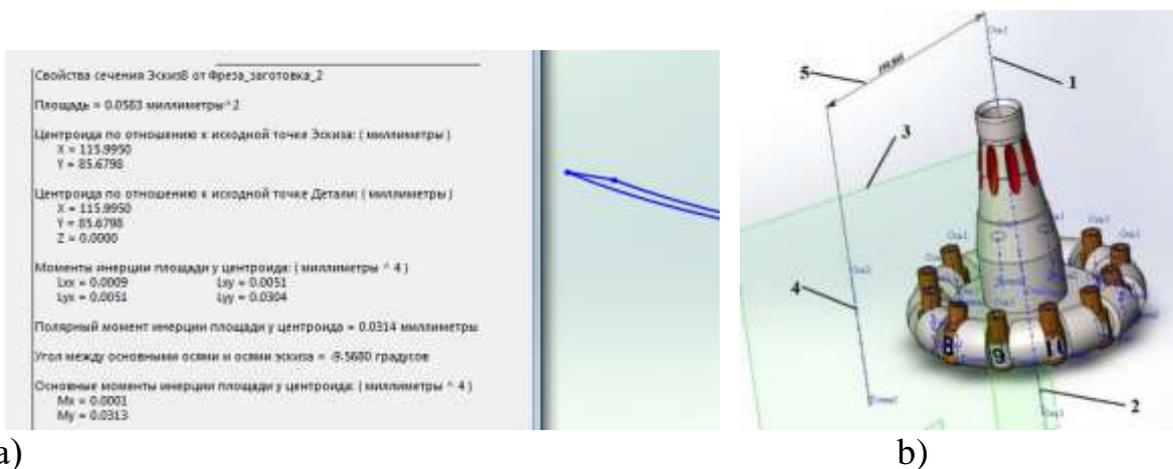
To determine the cut-off area, the resulting sketch (Fig. 2, b) was edited by cutting off the extra elements to form a cross-section of the cut (Fig. 3). Based on the thumbnail geometry, SolidWorks software defined the area with the specified accuracy in the specified units (Fig. 3).

On the other hand, it's possible to get the cut-off area's value without using the Motion module. Another method is: the points are constructed in the model (auxiliary geometry) in the centers of the cylindrical planar faces of the cutting elements; for each of the points, the conjugation "Coincidence" with the auxiliary planes on which the sections of the sections are constructed are formed for simulating the flow of the workpiece by changing the value of the conjugation "Distance". Coincidence "Coincidence" at each moment of time are repaid for 11 knives, and for the 12th knife are highlighted. The axis of the cutters (Fig. 3, item 1) coincides with the auxiliary axis

of the assembly (Fig. 3, item 2). The latter, in turn, is parallel to the fixed fixed axis 4, which is in the auxiliary plane 3. The imitation of the feed is effected by changing the distance of the conjugation (Fig. 3, item 5).



a) b)
 Fig. 2. Formation of a sketch by projection of cutting edges on the auxiliary plane:
 a - the position of the cutting element for projection; b - projection of the set of cutting edges



a) b)
 Fig. 3. Determination of the cross-sectional characteristics of the cut: 1 - auxiliary moving axle in the assembly;
 2 - auxiliary axis cutters; 3 - plane for the formation of projection sketches; 4 - fixed auxiliary axle in the assembly; 5 - conjugation distance to simulate the flow of the feed

Automation in the process of forming a projection sketch was carried out by studying motion in the functional variant "Animation". To do this, the time marker moved to the required position on the timeline and created key points for managing conjugation. First and foremost, key points for the "Distance" link were formed (Fig. 3., Pos.5). The difference in the values of the "Distance" conjugation in the two neighboring key points is equal to the feed on the tooth cutter. Due to this immitates the feeder cutters. The rotation and precise fixing of the mill is realized by repayment

and illumination of the conjugation "Matching" for the cutting elements and the auxiliary plane (Fig. 3, item 3). The time marker alternately aligned with the key points of the "Distance" conjunction and created key points for the conjugation of "Match", for example, for a cutting element with serial number 1, the conjugation was translated into a repatriated state, and the conjugation "Match" for the element with serial number 2 was highlighted. In this situation, projection sketches were constructed in the context of the collection by which sections of sections were determined.

Thus, the developed techniques allow us to determine the sectional area for the milling process with the end mills of virtually any structures. Using the developed techniques it is possible to get the pieces of cut at different positions of the cutter knife: at the entrance to the workpiece; in a plane that passes through the cutter axis and is parallel to the flow of feed; in a plane that coincides with the axis of the cutter and at the exit from the contact with the workpiece. The developed techniques can also be used to determine the volume of cut pieces of knife cutters with a variety of cutting patterns.

UDK 621.914

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IMITATIVE RESEARCH STIFFNESS OF CONICAL CONNECTION OF FACE-MILLING CUTTER FROM SHAFT SPINDLE 6R12

Significant to stabilize working conditions face-milling cutter (F-MC) plays and fixes it on the machine-tool, that is the accuracy and stiffness of the shaft connection with the spindle of the machine tool. Due to the existing errors in the manufacture of conical surfaces of the shaft and spindle, there is an unevenness of the fitting in the joint and even the absence of actual contact on the part of the length of the connection.

The stiffness of the conical joints depends to a large extent on the difference in the angle of the cone of the shaft and the spindle. The most unfavorable case is when the spindle taper angle is larger than the shaft taper angle. In order to overcome the mistakes made in the manufacture of conical creature stocks, an average duct was made with the removal of two seat belts. But in this situation it is possible to contact one of them.

Recently, designs of hollow conical shanks are being developed. Such shanks have a number of advantages including high static and dynamic stiffness. Therefore, it is relevant to model the static behavior of the conical hollow shank cutter during loading.

To improve the tapered coupling F-MC with a cone 7:24, a hollow shank with two contact bands is proposed. (Fig.1,a,b). The smaller pin belt (Fig. 1, b, pos.1) is

made hollow with reduced radial stiffness (Fig. 1,a.). For this purpose, the threaded connection of the shank is moved to the side of the big belt (Fig. 1, b, pos.2), and the small belt is executed with a reduced contact area.

To model the behavior of the conic hollow shank cutter during loading, a solid-state parametric 3D model of the cutter and a part of the spindle of the machine 6P12 was developed in the SolidWorks software product (Fig. 1, c)

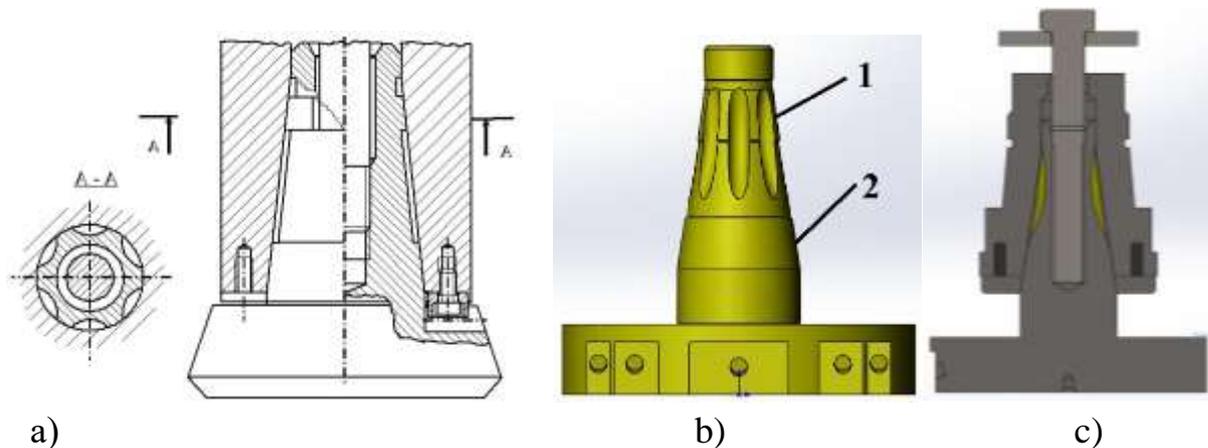


Fig.1 Model for studying the static behavior of a modified shaft: a is a schematic representation of a spindle joint and a modified shank; b - 3D model of the improved shaft; c - 3D model of spindle connection and modified shaft.

The simulation of the behavior of the conical hollow shank cutter during loading is not a trivial problem. To adequately simulate such a connection, it is necessary to determine the method of valuating the accuracy of this conic connection and to make variations of the 3D model for various combinations of marginal dimensional deviations, to determine the type of study, the parameters of the computational process, to form adequate contact conditions, to simulate the effort from twisting the knuckle, to form sensors for displaying displacements at specified points.

Cone shaped tolerances (TFR, TFL) were not taken into account, because the first method of rationing the accuracy of the cone was chosen - the common valuation of all types of tolerances by the admission of TD. Since TD is the tolerance of the diameter of a cone in any section, we confine ourselves to the cross sections of the base of the cut-out spindle cone. As it comes to tool cones, the 6th grade of accuracy is chosen. The combination of cone tolerance fields in the indicated sections will look like this:

- hole $\varnothing 19,8H6(+0,013)/0$, $\varnothing 19,8p6(+0.035)/(+0,022)$
- shaft $\varnothing 34,9H6(+0,016)/0$, $\varnothing 34,9p6(+0.042)/(+0,026)$.

A central radial load of 2000 N was applied to the F-MC.

Several combinations of marginal variations of dimensions (Table 1) were identified for studying the connection with standard and modified shanks, which were introduced into the parametric model through the use of the tool «Equations». This study is clearly nonlinear, so a static nonlinear study in the Simulation module was

used. Parameters of the computational process of nonlinear study, boundary and kinematic conditions are shown in fig. 2a, b.

In order to avoid artificially increasing the stiffness of the system, a thermosetting insert into a screw from an orthotropic material, which has a significant difference in the thermal expansion in the radial and axial directions relative to the reference geometry, was used to simulate the force from the twist of the knuckle (tightening of the cut). A thermal load (cooling relative to the temperature at which the body has a zero deformation) is applied to the thermosetting insert.

To display the constituent parts of the milling cutters, two sensors were formed in the model, the values of which were included in the table.1.

Table 1.

Combinations of boundary deviations of cones and results of simulation of radial rigidity

Combinations of marginal variations of dimensions, mm								
Set 1		Set 2		Set 3		Set 4		
Spindle	Shank	Spindle	Shank	Spindle	Shank	Spindle	Shank	
19,8	19,822	19,813	19,822	19,8	20	19,8	19,835	
34,9	34,926	34,9	34,942	34,92	35	34,9	34,942	
Standard shank, radial displacement, mm								
Axis Z*, MM	0,0808998		0,0621107		0,04914		0,0899449	
Modified shaft, radial displacement, mm								
Axis Z*, MM	0,0081659		0,00898946		0,0118237		0,00734605	

Notes: * - the Z axis is orthogonal to the rotation axis of the cutter.

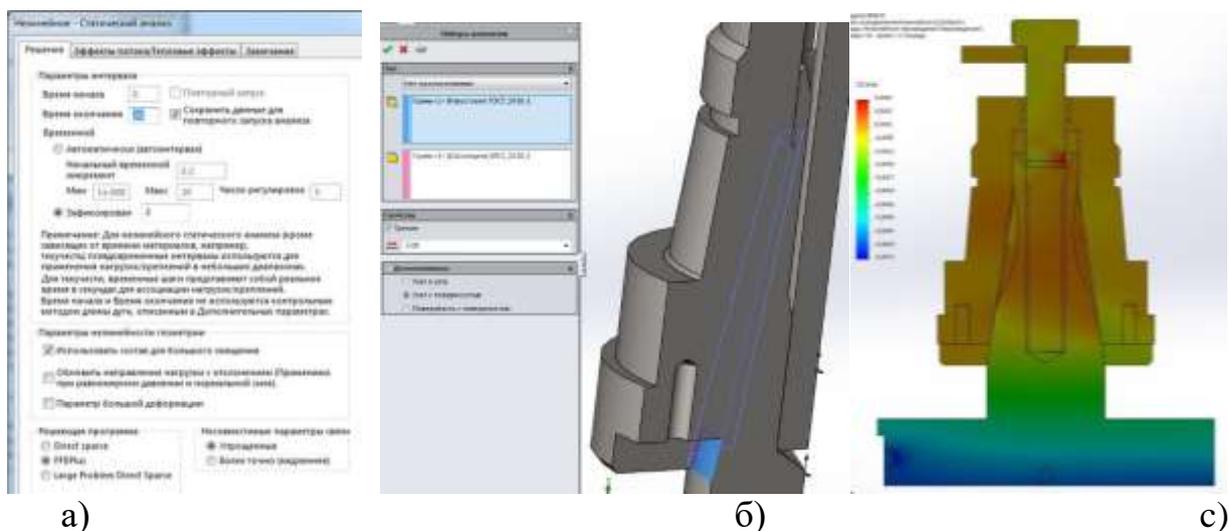


Fig.2 Parameters of the computational process (a), contact conditions (b) and diagram of movement along the Z axis (c).

The results of the rigidity study with the standard and modified shaft showed greater stiffness (less radial displacement) of the modified shaft in all cases. Thus, the assumption was made that a cavity shank with two contact belts and a reduced radial stiffness in the area of a smaller contact belt can, as a result, increase the rigidity of the system. The latter, in its turn, is one of the important factors in stabilizing the conditions of the workpiece cutter.

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METHOD OF PHYSICAL SIMULATION IN DETERMINING AN AUTOMOBILE AERODYNAMIC INDICATORS

Fuel economy of an automobile is one of the priorities in development of the world automotive industry. This feature is of prior importance because it contributes both to fuel saving and reducing engine pollutants into the environment. Fuel consumption decrease allows drivers to save filling expenses.

There are numerous methods to reduce fuel consumption. One of them is improvement of aerodynamic features of a car. This method was adopted from aviation, when it became clear that aerodynamic drag renders considerable influence on a car at high speed of motion. Its essence consists in research of influence of vehicle geometric parameters on fuel consumption and traction-speed characteristics.

To describe the structural perfection of a car body shape the drag coefficient (c_d) was introduced, that is determined experimentally. The lower the coefficient is, the lower the aerodynamic drag is. By means of cowlings of different constructions it is possible to change the form of a car, and thus to influence on the drag coefficient.

The method of physical design consists in experimental research of the physical phenomena recreated in laboratory conditions. For this purpose the model of the phenomenon is usually copied scaled-down or, if it is necessary, scaled-up. The advantages of physical simulation are:

- study of the phenomenon without its mathematical description;
- visualization of the phenomenon that is simulated;
- reduction of financial expenses on experiments compared to the model of a standard of object under investigation;
- wide change of the parameters under investigation.

When preparing, realizing and treating the results of tests using the method of physical simulation it is important to adhere to the values of transitional coefficients of the theory of dimension and similarity that is basic for realization of physical simulation. It means that if variable values that characterize the phenomenon in certain moment of time and space are proportional to other variable values of corresponding time and space, such phenomena are equivalent. Thus, the coefficients of proportion are named the coefficients of similarity.

For two models to correspond it is necessary to meet the criteria of geometric, kinematics and dynamic similarity.

It is offered to create the experimental setting that consists of the horizontally located transparent pipe of round cut. An electric motor with a ventilator, that creates a blast, is set at one side of the pipe. In addition a blast rectifier is set for creating an even air stream.

A scaled car model is set on a platform. The platform is fastened to the pipe through 4 pendants joint. The pointer is fastened to one of the pendants. When the ventilator is turned on, under the influence of air flow the car model will deviate together with a platform, and the pointer will show the value on a measuring scale. Testing is carried out on a scaled model and the values of forces, obtained during the experiment, must be calculated in accordance with the theory of dimension and similarities.

Directions of air flows can be determined, if to paint the air flow with the stream of smoke. Another method is sticking thin threads to the car model. They will take the position in the air flow that shows local streamline. The obtained data will allow to select the cowlings of optimal construction for a scaled model and to find the most effective location for them on a car.

As a result of such research it is possible to attain reduction of drag (streamlining) coefficient that will reduce aerodynamic drag, and in its turn, will allow economizing on fuel consumption.

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AKKUMULATION VON ^{137}Cs IN DEN RINDEN DER HAUPTLAUBBÄUME DER SUBOR IN POLISSYA ZHYTOMYR

Radioökologen haben bereits in den ersten Monaten nach dem Unfall von Tschernobyl bezeichnet, dass eine ziemlich hohe spezifische Aktivität von ^{137}Cs in den äußeren Schichten einer Baumrinde ist und sie primäre radioaktive Oberflächenverschmutzung bestimmt hat. In den folgenden Jahren war die Rinde dank natürlichen Faktoren selbstgereinigt und hat weniger radioaktive Verschmutzung. Aber bis heute ist die Akkumulation von Radionukliden in den Baumpflanzen sehr hoch. Der Zweck dieser Erforschung ist die Bewertung der heutigen Ebene der radioaktiven Verschmutzung von ^{137}Cs in den Rinden der Laubbäume [1, c. 168].

Die Untersuchung war auf dem Territorium des staatlichen Unternehmens "Naroditsk SWW" in 2017 in den Typ Waldpflanzenbedingungen der frischen (B2) und feuchten Subor (B3) durchgeführt.

Als Objekte der Forschung waren die wichtigsten Laubbäume von Zhytomyr Polissya, nämlich die Eiche (*Quercus robur*), Birke (*Betula pendula*) und Faulbaum (*Frangula alnus*) untersucht. Es wurden die Rindenproben und entsprechende die Bodenproben genommen. Die Rindenproben wurden in einer Höhe von 1 Meter von der Erdoberfläche genommen. Die Messungen der spezifischen Aktivität von ^{137}Cs in Proben wurden im radioökologischen Labor von ZSTU mit Hilfe des Gammaskpektrometers GDM-20 10 PLUS durchgeführt. Bevor die Messungen wurden die Proben getrocknet und homogenisiert. Die Dichte der radioaktiven Verschmutzungen des Bodens ist auf dem forschenden Grundstücke 599 kBq/m² (16 Ki/km²) im frischen Subor und entsprechend 517 kBq/m² (14 Ki/km²) im feuchten Subor.

Auf den Forschungsergebnissen basierend, ist der höchste Mittelwert der spezifischen Aktivität von ^{137}Cs auf beide Grundstücke in der Eichenrinde beobachtet und der kleinste ist in der Birkenrinde. Es sollte betont werden, dass trotz der Tatsache, dass die Dichte der radioaktiven Verschmutzung des Bodens mit ^{137}Cs auf dem Grundstück B2 höher als auf dem Grundstück B3 ist, aber in dem feuchten Subor sind die Indikatoren spezifischer Aktivität in allen Arten höher als in frischem Subor: für Eiche ergeben sie 4353 Bq/kg (B2) und 5099 Bq/kg (B3), für Faulbaum – 1666 Bq/kg und 2722 Bq/kg, für Birke – 482 Bq/kg und 1049 Bq/kg (Abb. 1 und Abb. 2).

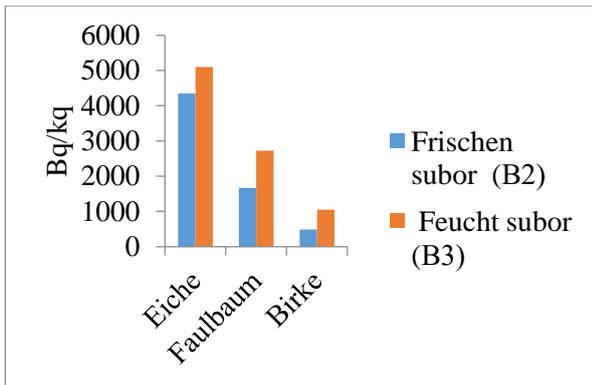


Abb.1 Die spezifische Aktivität von ¹³⁷Cs in der Rinde von Laubbäumen

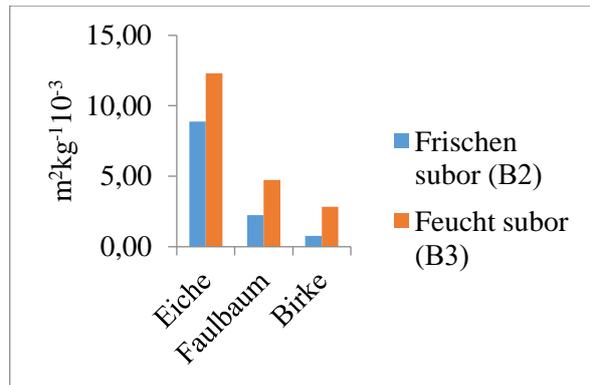


Abb.2 Die Übergangskoeffizienten von ¹³⁷Cs in den Laubbäumen

Es kann bemerkt, dass auf beiden Grundstücke beobachten eine allgemeine Tendenz der Verkleinerung, des Wertes der spezifischen Aktivität von Radionukliden ¹³⁷Cs für drei Baumarten: die höchste radioaktive Verschmutzung ist für die Eichenrinde charakteristisch und die niedrigste – für die Birkenrinde. Die Werte der Übergangskoeffizienten (UK) sind für ¹³⁷Cs in der Rinde von Baumarten auf den geforschten Grundstücken auf der Abbildung 2 dargestellt. Entsprechend dieser Werten kann man die Konsequenzen ziehen, dass die größten Werte der Übergangskoeffizienten im frischen und nassen Subor in der Eiche sind (8,87 und 12,31 entsprechend), in dem Faulbaum – niedriger (2,23 und 4,73),, und in der Birke – am niedrigsten (0,76 und 2,84). Wie bei den Indikatoren der spezifischen Aktivität der Übergangskoeffizienten ¹³⁷Cs in der Rinde ist höher in allen untersuchten Laubbäume im feuchten Subor. Trotz der Halbwertszeit von ¹³⁷Cs dass passiert ist, bleibt der Grad der radioaktiven Verschmutzung die Rinde hoch. Wenn die Werte der spezifischen Aktivität von ¹³⁷Cs mit den normative Indikatoren verglichen werden können, wird dann die mittlere spezifische Aktivität des Radionuklids in die Eichenrinde die normativen Indikatoren in 7-8 mal übersteigen (Am=5099 Bq/kg und 4353 Bq/kg mit zulässig das Niveau <600 Bq/kg). In die Faulbaumrinde wird die spezifische Aktivität 2–4,5-mal größer (Am=1666 Bq/kg und 2722 Bq/kg mit zulässig das Niveau <600 Bq/kg). Es sollte gesagt sein, dass unter diesen Bedingungen kann man nicht die Rinden als medizinische Rohstoffe verwendet sein.

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SPECIFIC ASPECTS OF CRACKING AND BLOCKING FORMATION

The existence of crack systems in granite deposits is quite logical and is related to the structure and the process of these deposits formation of magma. Tensile strength during movement and contraction tensions during cooling of the newly hardened rock as well as other factors cause cracks formation, first of all, tensile cracks, in primary separation. Contraction cracks are associated with the reduction of rock mass and; they are oriented perpendicular to the direction of the reduction. The direction of the reduction depends on the position of the cooling surface and the speed of cooling. If deep intrusive bodies cool slowly the whole mass of the rock cools as a single whole. Cracks, parallel to the contacts with lateral rocks, occur along the edges of massif, thus, a plate-like joints appear. The thinner joint, the faster it cools. If cracks appear perpendicular to the contacts, the location takes the parallelepiped form. When ball-like bodies of intrusive deposits, flows, etc., cool stronger than in perpendicular direction, the decrease in density of a flow causes strong development of cracks perpendicular to surfaces of this flow; in this way, prismatic or columnar joints appear.

Primary and secondary structures are distinguished in the process of granite deposits study and evaluation. The first concept includes primary linear textures that appear in a certain arrangement of grains of rock forming minerals; this corresponds to the period of liquid or plastic masses of magma. Primary cracks formed during fractures or splits in already hardened pluton also belong here. Secondary structures that cover the primary are the result of subsequent changes in granite massif and are manifested in additional systems of cracks, which often make deposits unfit for the development of precast stone.

For a long time, the relationship between the mechanical properties of gabbro-norites and labradorites with their structural and texture features was studied for obtaining optimal directions of fracture line and reducing labor costs when producing blocks. Experiments were conducted with rocks with different structural and texture characteristics. The lines of small stone fractures for all investigated fields have close azimuthal location, which is due to the direction of the magma flow along the entire crystalline shield. In particular, in Golovyno labradorites, the weakest cohesion of minerals is manifested between crystals of plagioclase and pyroxene, which forms are elongated in the direction from the northwest to the southeast; in Slipchitsky gabbro-norites the cohesion is manifested between crystals of plagioclase and pyroxene grains, which are oriented from northwest to south-east.

All studies during geological exploration and the creation of the project for the development of deposits give an average value regarding the choice of direction for advancing the mining front and the direction of anisotropy of massif. The results of

stone deposits evaluation should include the definition of shape and size of possible blocks and their change with depth [1].

The shape of natural blocks is determined by the deposition of the cracks planes. Thus, the intersection of cracks at right angles allows separating blocks from massif in the form of regular parallelepipeds. If two of three systems of cracks intersect each other at an acute angle, the blocks come out in the form of monoclinic prism, which requires an additional passaging of a block, that is, giving it the shape of a parallelepiped by shearing. When passaging blocks, 25-35% of their original volume is lost in the form of ocellus, which leads to the decrease in the output of blocks and significantly increases extraction [2].

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CALIBRATION OF HAZARDOUS GAS SENSORS INSTALLED ON MINI UNMANNED AERIAL VEHICLES

The question of the quality of the air in the work areas, nowadays, is quite acute, which is why there is a large number of studies in this direction. Many harmful and explosive gases, which cannot be smelled and may not be felt, but in high concentrations lead to industrial accidents or affect human health such as carbon monoxide that can quickly lead to death.

Air analysis of the content of harmful gases is required in the air of the working zone - where there are specific sources of harmful substances. For example, in the air of boiler houses it is often possible to detect excess concentrations of carbon monoxide and nitrogen oxides, and in the air of sewage pumping stations hydrogen sulfide or

ammonia could be repeatedly exceeded. In such working conditions, sources of gases leakage could often be found in hazardous or inaccessible places [1]. That is why it is important to introduce a reliable mobile detection system for dangerous gases to prevent such problems.

A variety of conditions and features of production requires different scenarios of monitoring and control planning. In this case, the detection system must meet certain requirements, specifically: autonomy, reliability, accuracy, easy deployment on the place. In addition, it is compulsory that there should be remote control [3].

Mini unmanned aerial vehicles (UAVs) were selected as a platform for the system that is under study. In general, today mini UAVs have a wide range of applications and have several benefits over ground mobile systems:

- Are better suited for implementation in the work environment, as they have a lower risk of causing an industrial accident;
- Have more flexibility in terms of maneuverability;
- Data collection and analysis area is wider compared to ground systems, because certain gases are lighter than air and cannot be detected by the systems on wheels.

Nevertheless several disadvantages must be highlighted, such as:

- Less load-carrying capacity compared to terrestrial mobile systems; [2]
- Certain structural difficulties are encountered in the collocation of gases sensors due to obstacles such as, for example, air streams generated by UAV screws.

The connection, programming and calibration of sensors will be carried out with the hardware computer platform Arduino YUN. It was selected because it can be used both to create standalone interactive objects and to connect to software that runs on the computer.

Calibration of gas sensors will be carried out with the Arduino IDE and MATLAB software. The speed of the sensor response to change of the gas environment and the accuracy of the indicators will be checked. Each of the selected sensors will be connected to the Arduino YUN according to the scheme shown in Figure 1, and then a software code will be developed for checking the specified parameters.

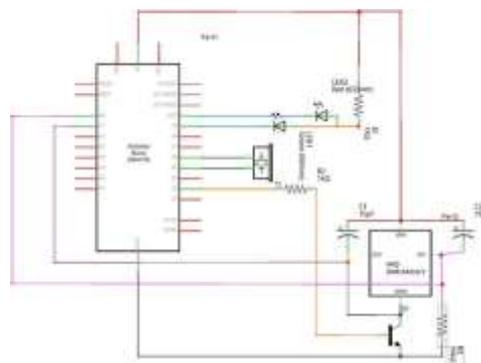


Fig. 1. Diagram of connection of gas sensors for further calibration

It is planned to carry out an experimental confirmation of the efficiency of the proposed scheme and to calibrate the target gas sensors in the future.

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DESIGN TRAINING OF SPECIALISTS IN THE FIELD OF "INDUSTRIAL ENGINEERING"

Today it is difficult to imagine any sphere of human activity that the designer would not touch. The process of the implementation of the design education in Ukraine depends on the circumstances of the development of the highly developed machine-building industry. In this regard, higher educational technical institutions (Mechanical Engineering Institute of the National Technical University of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute", Ukrainian National Forestry University, National University of Life and Environmental Sciences of Ukraine, Zhytomyr State Technological University and others) began to prepare bachelors, masters and doctors of philosophy in the sphere of knowledge 13 "Mechanical engineering"- "Engineering design", "Computer-aided design". As claimed by Boychuk O., Orlova N., Sidorchuk L., Ryzhova I., etc. in their researches, the art of design is one of the driving factors of social changes and carries a significant potential of transformations of the economic and cultural spheres of human life.

There is a myth that industrial engineering is a specialty provided knowledge how to design a machine, but actually it is a possibility to obtain the best technical education and become a skilled engineer. Industrial engineering is a specialty of a wide profile, which allows the future specialist to understand the components of large industrial production, to understand the structure of any machine tools, industrial systems and even planes and spacecraft; know how to provide innovative computer

technologies at work, to operate all special software and develop brand-new approaches to the industry optimization.

Machine parts and knots are made according to the drawings, on the basis of the projects i.e. the set of calculations, graphic materials and explanations, assign for argumentation and determination of construction parameters (kinematic, dynamic, geometric, etc.), its productivity, economic efficiency. In case of particularly responsible constructions, the project is complemented by a layout or an operating model.

In all areas of design and engineering, much attention is paid not only to the aesthetic, technical, functional characteristics, but also to the ergonomics of equipment. The most general tendency is the aspiration of designers from different countries to use the most laconic forms of machine-building equipment. This phenomenon is not accidental, it is caused by a number of factors and not only by the fashion movement as it is sometimes interpreted. First of all, it is caused by the desire to optimize the "human - machine" relations.

Therefore, the designers are facing a lot of fundamental questions put by the shaping of metalworking machines. It should be noted that the design of machines is a creative process with the inherent laws of construction and development. The main features of this process are the multivariety of the decisions, the necessity of coordinating the decisions with the general and specific requirements of the constructions, as well as with the requirements of the relevant standards regulating the terms, definitions, conventions, measuring system, methods of calculation etc.

Studying the questions of ergonomics and ergonomic design, the acquisition of techniques of incorporating the human factor into designing the environment, equipment, etc. will provide the training of highly skilled professionals who can not only evaluate, but also create products that will ensure high quality and efficiency of work, health and safety of people who will use the equipment or stay in the projected environment.

Complex technical sciences such as design and ergonomics in machine building differ from the classical ones. They study and describe at least three types of objects: 1) "human- machine" systems (computers, control panels, semiautomatic devices, etc. 2) complex technosystems (engineering constructions, planes and technical systems for their maintenance, airfields, roads, service equipment etc. 3) such objects as technology or technosphere.

Through creative activity, design and ergonomic research based on scientific knowledge and technical inventions new operating principles, ways of their implementation, construction of technical systems or their components are created. For successful development of the society, it is important to complement science, art and production technologies, especially in training designers for different spheres of human activities.

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APPLICATION OF MODERN INFORMATION SYSTEMS FOR OPERATIVE CONTROL OF PRODUCTION QUALITY AT DIMENSION STONE QUARRY

When mining blocks of decorative stone, the engineering service of the quarry has to conduct operational management of the block products quality. The main problem of this process is the lack of complete information about the quality of raw materials located in a particular area of the quarry.

As a rule, the initial data for managing the quality of the massif is the visual inspection of the bank and description of the nearest exploration wells at the distance of 50 m, on the average.

It is obvious that the management efficiency of such output data will be low. Therefore, the urgency of developing a method for rapid analysis of a deposit quality is out of doubt.

The quality of the block raw material is determined by the defect, energy capacity of processing, decorative value and corrosion resistance of products. Therefore, it is reasonably to consider the expected quality of the polished tile as a basis for assessing the quality of block raw materials.

According to the current requirements for conducting a quality assessment, samples of ornamental stone, not less than 4 cm in size, are the most preferable to use. Handheld angular grinders with a cutting disc of a maximum permissible diameter of 230 mm are suggested to use for selection of samples.

As a result, we can get samples of 80 mm in size. A sample of this size will allow evaluating the main qualitative characteristics of a block stone with a high degree of reliability.

The basis of the quality assessment is the determination of the area of ore minerals, the orientation of minerals and defects, as well as the colour coordinates of samples. In order to evaluate all above mentioned indicators, a polished texture is required. Thus, selected samples of gabroid rocks will be processed by grinding and polishing machines (handheld or stationary of cantilever type for processing cassettes formed from samples). Marking samples with paint and determining the coordinates both of sampling point (using the T30 theodolite) and measuring tape or level rail RN-3 is offered to evaluate spatial variation of qualitative characteristics.

Distance between selected samples depends on the uniformity of the massif, the presence of certain defects and the scale of drawing. Taking into account the expected accuracy of the obtained coordinates of points and the accuracy of their mapping, the distance between e sampling points can be in the range of 5 m to 25 m.

Further processing of received samples was to scan them by Epson EP1500 scanner. Received image based on the overlay of certain masks is processed by MdiStones program; relative areas of uniform black colour zone were determined in RGB colour system using the mask overlay.

A uniform black colour is selected as a criterion for assessing the degree of ornamentality, as far as the degree of blackness of gabbro determines both the market value of stone and the basic aesthetic indicators of products.

Ornamental elements geometrization can be performed using GIS systems and based on the data of relative areas and coordinates of samples.

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UTILIZATION OF ROCK REFUSE AT STONE PROCESSING ENTERPRISES

Rock refuse generated by stone-working enterprises has a certain composition and properties, as well as the degree of their hazard for the environment and human health. It was investigated that the total potential capacity of enterprises that can use refuse as a secondary raw material is utilized only within the limits of 11%. Stone processing enterprises, which recycle refuse on their own, have a high coefficient of income coverage and a waste efficiency ratio of approx. 1.

The ideology of rational use of available natural resources at stone-processing enterprises is based on the use of refuse. The main reasons for this problem are: raw material oriented structure of stone-processing enterprises, the basis of which is the intensive use of natural resources; obsolescence, excessive energy and material consumption, high-waste production technologies of stone processing, insufficient level of refuse recycling by stone processing enterprises, export orientation of raw materials- and energy-intensive stone production; low competitiveness of production; ineffectiveness of organizational and economic mechanism of nature use and environmental activity of stone processing enterprises. Due to these problems, the share of stone-processing enterprises in waste generation and environment pollution is significantly increasing.

Stone processing enterprises utilize just 44% of refuse (crush-rock pad for roads, building needs, etc.), about 39% is imparted for utilization to special enterprises which have permission to carry out such activities; and 18% of refuse is to be buried at landfill of solid domestic waste as a layer. Such situation indicates a low level of utilization of refuse as a secondary raw material at stone processing plants.

Thus, the efficiency of refuse utilization without harm to the environment at stone-processing enterprises at the present stage of their operation is low and requires the development and implementation of certain measures. The main measures to increase the efficiency of stone processing enterprises are: the introduction of new technologies of stone processing which will enable the development of low-waste and non-waste technological processes in stone-processing industry. Prospects of further research are connected with the substantiation of the development of secondary raw materials market.

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DISTRIBUTION OF THE CAREER FIELD ON EXPRESSION OF ROCKS

The arrangement of rock massifs by landing is a selection and graphic representation of the boundaries of the quarry fields. Nowadays, it is generally accepted that rock placement is determined by two main factors of their massif: first, fracturedness, and secondly, the physical and mechanical properties of rocks and their fragments, and above all, their durability. The most important factor is the first factor, namely fracture. Since the main factor determining the landing of rocks is the degree of fracture, then the procedure of zoning the quarry field on the landing must begin with a static assessment of the array and the development of local classification of the rocks of the field by blockage.

The classification, especially including its landing options, and the mapping of rocks should be periodically adjusted. The purpose of such an adjustment is to optimize the landing options and to more precisely divide them into categories of explosions. The latter is achieved by introducing intermediate classes for fracturing, and accordingly, the categories of landing.

Another method for determining the fracture of the array to control the quality of drilling and blasting work was the computer modeling of the block structure of the rock massif using the Surfer 8 program. The volume of the database of point patterns

of the block structure was 545 models (points), each of them included the following characteristics of the block: orientation (azimuth and angle of incidence) of block-forming cracks, average block size, blocking category, block form, belonging to a particular engineering-geological lithotype.

Inquiries to the database of point models for a given plot or a whole career field software implemented spatial and probabilistic-statistical simulation of the block structure of the processed rock massif. The point models were formed on the basis of program implementation of the algorithms used for determining the following parameters of the block structure of the array: the average azimuth and the angle of cracks; average distance between cracks in each system; the average size of an elementary structural unit; categories of fracturing (blocking) of rocks; block form

Based on the results of the simulation described above, a database of point models of the block structure of a rock massif, block category, which allows implementing a spatial modeling of the block structure of the array within the entire career field, is formed.

It is used to construct in this case the technique of isolation due to the unsteady nature of the spatial change in the size of the block in an array of rocks.

To establish the law of the segment distribution of different sizes in the array, the processing of the results was conducted using the basic provisions of mathematical statistics and probability theory. The whole array of data was broken down into classes through 0.2 m, the percentage of each class was calculated and a distribution was made using the Pearson criterion. According to the results of this verification, the theoretical curve was obtained and its analytical expression is a differential function of the distribution $F(x)$, which allows determining the probability of its contents in the array according to a given size of the individual.

The method of computer modeling of the block structure of the rock massif made it possible to evaluate their landing, including a number of successive procedures: the formation of the primary database of field measurements of the parameters of the cracking of the array – the creation of a point pattern of the block structure for each observation station – the formation of the database of point models – spatial and probabilistic - the statistical modeling of the block structure of an arbitrarily specified area or quarry field and in general on request to the database of point models. Also, it was possible to determine, in accordance with the categories of rock placement and their fracture, to determine the optimal size of wells for improving the quality of drilling and blasting operations and the release of the required and quality raw materials.

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METHODS OF STABILITY ASSESSMENT OF OPEN-PIT SLOPES IN THE ROCK MASSIVE

The development of technology of open-pit mining and the rapid pace of mining equipment development caused the increase in capacities of mining enterprises, in particular, quarries. Increasing the depth of mining operations requires the maximum accurate calculation of the parameters for maintaining stability of open-pit slopes and benches, taking into account each factor of the influence on the subsequent safe and cost-effective mining.

The purpose of the work is to analyze the methods of assessing stability of open-pit benches for the possibility of further safe and continuous management of the development of a deposit under such disturbing factors as: thrust fall, soil flow, subsidence and shifts.

Modern tendencies of minerals extraction in an open pit involve a constant increase in the depth of a quarry. For the current conditions the depth of 500-700 meters is not an impossible task, on the contrary, it is a goal that can easily be achieved. Special attention is required to assess the stability of slopes when carrying out this task.

One of the precise methods is the graph-analytic method of K. Terzaghi, which is based on the idea to consider a fault surface as a plane-cylindrical. This method gives effective results in a relatively homogeneous and unpolluted mass. The main disadvantage of using this method at the open pit where the slope is composed of homogeneous soft rocks is a large difference in the indicators of the rock massive points.

Nowadays, the technology of laser scanning of slope walls and open-pit slopes, which allows to carry out a volumetric analysis of slope walls with the identification of potential dangerous shifts in sloping areas, has gained its popularity at mining enterprises. Scanners allow building a 3D model taking into account disturbances and potential slip lines. The laser scanning technology is the most generalized and precise method. This method is less time consuming but economically inefficient for small enterprises.

There are many modern methods for calculating stability of slope walls, but each of them has a set of factors that are suitable for a specific method. Thus, the most appropriate method of observing stability provides an opportunity to evaluate all possible risks and predict them over time. Taking into account all possible disturbances, it is possible to determine the parameters of slopes stability and the limiting permissible deviations for a long-term stability and exploitation of the bench for the given purposes.

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PERSPECTIVE APPLICATION OF MILLING MACHINES DURING WORKING ROCKS OF AVERAGE STRENGTH

Rapid pace of urbanization and a sharp increase in the world's population the decrease of mineral reserves. Most minerals and rocks that we use in our everyday life are non-renewable, that is why the problem to minimize the losses of mining raw materials at the stage of its extraction is quite relevant now.

The use of milling machines, in comparison with the classical cascade method of minerals extraction by drilling and blasting operations, will reduce the number of substandard rocks which accumulate in refuse dumps and also will provide an opportunity to reduce stripping ratio, as well as to narrow the boundaries of the quarry field. Even such little things will help to use the subsoil more rationally, as the area for spoil dumps and for the operation of mining works will decrease [1].

Regarding the process of separating, there is also a number of advantages. Firstly, the cost of extracting one ton of crushed stone materials by layer method, in comparison with cascade method, will decrease by 20-25 per cent. This is due to the decrease in the number of technical operations. Secondly, there is no need for primary crushing as the milling machines provide a stable extraction of raw material with fractions of 30-40 mm. Thirdly, the process of tipping and transportation of mined minerals is simplified and it is possible to select the rock mass directly in the quarry.

The disadvantages of this method are the following: considerable dustiness of the site being worked out; the high cost of the machine and its maintenance; the ability to break the rocks effectively by the compression strength to 150-170 MPa.

This method of development was applied during the working of "Tashkura" deposit, where phosphate ores with a limit of compressive strength of 100-120 MPa are being extracted [2].

After chronometric measurements, it was found out that performing one drivage the machine allows working the rock layer with a depth from 40 to 45 cm. The average milling speed was from 5.5 to 7.2 m /min. The average productivity was 400 cubic m /hour.

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DETERMINATION OF THE OPTIMAL METHOD OF COMPUTATION OF RESERVER FOR THE MIROPOL DEPOSIT

The Miropil deposit of granite gneisses is located in the western part of the Ukrainian shield.

A majority of researchers believe granite gneisses to be granites that have crystallized deep in the earth's crust either during the cooling of the magmatic melt under directed pressure or during the process of the magma's movement, as a result of which there is parallel arrangement of the mica (more rarely, of the other minerals).

Ore-reserve estimates include the determination of tonnages of ore and average grade or value per ton. Since the grade or content of valuable metal establishes the difference between rock that may and may not be classed as ore, tonnage cannot be estimated without considering the question of grade.

Determination of quantity and quality of minerals in the subsoil spend for the purpose:

- delineation of mineral deposits
- distribution of stocks according to their economic value, degree of exploration, categories of occurrence, conditions of extraction
- determination of calculation parameters
- quantitative account
- estimation of accuracy of calculation results

The main tasks of inventory calculation are:

- amount of minerals in the subsoil with its division into grades and categories of exploration;
- quality of minerals;
- technological properties of minerals;
- geological and mining technical conditions of occurrence;
- the degree of reliability of the parameters.

In this project, it is planned to perform the calculation of minerals by several methods, to evaluate their accuracy and to choose the most optimal method for calculating mineral reserves for the Miropil deposit of granite gneisses.

Depending on the form and conditions of occurrence of the deposit, the nature of the change in the content of useful components, the intelligence system and the density of reconnaissance points, goals and purpose of inventory counting, different methods of calculation are used.

Based on the geological structure of the deposit and the method of development, the calculation of granito-gneiss reserves is made using the geological blocks method on a topographic plan of scale 1: 2000.

In this project, in addition to the method of geological units, stocks are calculated by methods of parallel cuts and triangles and compared to them.

1. Method of vertical cross sections.

To determine the volume by the method of vertical sections, we build a plan and calculate the area of each figure. This method is used in determining the volumes of flashing and extraction blocks with elongated approximately parallel contours.

Vertical cuts were carried out through 3,3 m. As a result of the performed research, in determining the volume of the block, which was subjected to vertical parallel cross sections, $V = 18808,287 \text{ m}^3$.

2. Method of horizontal cross-sectional.

As a result of the performed researches in determining the volume of the block received $V = 19196,780 \text{ m}^3$.

3. Method of triangles.

When calculating stocks by way of triangles, all reconnaissance work on the plan within the contour computation is connected directly.

In addition, these lines should not intersect. As a result, they receive a network of closed triangles. If the sides of these triangles are perpendicular to the plane of the projection to draw a plane, then everything is supposed to split into a set of connected straight obliquely triangular prisms, the total volume of which is the uniform volume of the minerals $V = 19223 \text{ m}^3$.

*Comparison of the accuracy of different methods
of measuring the volume of the block*

Method of computation	Actual indexes, m³	Operational computation	Deviation, %
vertical cross sections	18808,287	19197,503	2
horizontal cross sections	19255,11		0,3
method of triangles	18947, 67		1,3

The best way to calculate the reserves for the deposit in Miropil was by the method of horizontal sections. The method is quite simple to use and has a relatively small amount of computations. The largest deviation from operational accounting was when calculating the vertical cross-sectional method, so it should not be used.

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PROSPECTS OF USING PLASMA CUTTING

Cutting metal is the process of separating a sheet of metal into parts. It has become widespread in various fields of production. Up-to-date, there is a large number kind of cutting of metals: laser, gas-oxygen, hydroabrasive.

Such types of cutting have a number of advantages. For example, laser cutting allows us to make a smooth, accurate cut; waterjet cutting has a high cutting speed, and also allows cutting metal rolls up to 300 mm thick with a high accuracy. However, they also have disadvantages: laser method is only used for rolling thickness not more than 20 mm. It is difficult to work with stainless steel, aluminum and its alloys. A huge disadvantage of the method of waterjet cutting of metals can be called extremely high cost of cutting.

The disadvantage of gas-oxygen cutting is the formation of products of combustion and melting of metal as a result of a long-term high-temperature impact on the material – slags, incrustations, burr and oxides, which must be removed from the edge of the product [1].

Along with the mentioned above cutting methods there is one more. It is plasma method.

Plasma cutting is a process that cuts through electrically conductive materials by means of an accelerated jet of hot plasma. Typical materials cut with a plasma torch include steel, stainless steel, aluminum, brass and copper, although other conductive metals may be cut as well. Plasma cutting is often used in fabrication shops, automotive repair and restoration, industrial construction, and salvage and scrapping operations. Due to the high speed and precision cuts combined with low cost, plasma cutting has widespread use from large-scale industrial CNC applications down to small workshops [2].

The beginning of development of plasma technologies, i.e., methods processing of metals, parts, products and biological objects using plasma, can be considered the 1960s. At the same time, was invented technology for plasma cutting. Over time, plasma cutting equipment has been greatly improved. Modern plasma cutting is characterized by high speed, low operating costs, better quality.

Plasma cutting cuts the metal with the help of heat, which is released by a compressed plasma arc.

A plasma arc is obtained in a special device such as a plasma torch. A plasma torch is a device for generating a directed flow of plasma. A plasma torch is a technical device in which a current flows through a discharge gap to form a plasma used for processing materials. Metal cutting is performed at high temperatures, reaching 15000-20000 C°, due to which it is possible to use this method to almost all types of metals

and alloys, including cutting high-carbon metal, low-carbon, as well as such metals as cast iron, titanium, stainless steel and various non-ferrous alloys [3].

Advantages of plasma cutting, compared with other methods of cutting metal, are:

- 1) any metals are processed – ferrous, non-ferrous, refractory alloys, etc.;
- 2) cutting speed of small and medium thicknesses several times higher than the rate of flame cutting;
- 3) small and local heating of the cut billet, excluding its thermal deformation;
- 4) high purity and quality of the cut surface;
- 5) process safety (no need in cylinders with compressed oxygen, flammable gas etc.);
- 6) a complex figured notch is possible;
- 7) the absence of restrictions on the geometric form [4].

Due to the merits of the plasma cutting method, the scope of using such a process in commensurability with economic efficiency is extremely wide on an industrial scale.

Plasma cutting has versatility, which provides its application not only in relation to steel, copper, aluminum, cast iron, brass, bronze, titanium and other metal but can also be applied to several sheets of metal simultaneously.

Automation of the plasma cutting process has made it possible to widespread this technology by attitude towards the aircraft, nuclear, military and other industries. The improvement of the process and the reduction of the heating region at a temperature of several thousand degrees allow it to be applied in a sufficiently accurate comparison with similar processes. Modern technologies allow to lift plasma cutting to a new level, its efficiency and profitability in its range of operations does not know equal. Thus, the use of plasma cutting as a high-precision, effective, safe and universal process of metal processing, has wide boundaries in the modern machine-building industry and where metalworking can not be avoided. In addition, plasma cutting is also a highly environmentally friendly process [5].

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THE EFFICIENCY OF CRUSHING OVERSIZE SECONDARY MATERIAL BY HYDRAULIC HAMMER

Mining operations show that even using the most effective methods of blasting cannot completely exclude the output of a large fraction (oversized) material. Hydraulic hammers are commonly used for the destruction of the oversized material in quarries where, for some reason, there is a limit for blasting operations. Percentage of oversize output in the exploded mass can vary from 5 to 20 percent depending on the mining-and-geological conditions. Getting an oversized piece in the receiving slot of the crusher is associated with stopping the entire technological chain of the enterprise. Therefore, the method with the use of hydraulic hammer requires a detailed study.

Despite the effectiveness of blasting operations, there is still a large amount of rock material subjected to the secondary crushing. The presence of oversized pieces complicates conducting mining operations, deteriorates the efficiency of the rock mass preparation, and increases the cost of minerals extraction. To place oversized material it is necessary to occupy the area of the quarry face, which complicates the conduction of mining operations, especially when deepening quarries. Oversized material differs in physical and mechanical properties (density, strength, fragility, etc.), forms, sizes, etc., which determines the complexity of the choice of technical facilities for the destruction of oversized pieces and their following effective use.

The productivity of the destruction of oversized material depends on the technical parameters of hydraulic hammer and on the characteristics of an excavator used as the base on which the hydraulic hammer is fixed, as well as on its proper use. Oversized crushing is the most effective at right angle (90 °) to the hydraulic hammer. In other positions of the hydraulic hammer, a skew stroke is carried out causing an adverse mode of operation – a blow-off (single shot) or lateral bounce. The maximum radius of fracture first of all depends on the length of the arrow. Radius, which allows a direct impact of the hydraulic hammer, also depends on the length of the handle and the length of the arrow. The front or the rear position to the base machine is recommended when working with a hydraulic hammer. Using hydraulic hammer from the sides of the base machine can lead to the sharp, devastating vibrations of the machine and it can overturn an excavator.

The performance of a hydraulic hammer in the destruction of oversized material is influenced by many different factors. The main factors are:

- Specific energy intensity of the oversized material destruction;
- The radius of the oversized material destruction, at which hydraulic hammer has the maximum clamping force, due to the weight of the handle.

Impact momentum determines the basic physical criterion of the destruction process – the specific force of an impact, i.e., the voltage under impact influence. Destruction occurs if the voltage exceeds the strength limit of the rock.

Technical performance of hydraulic hammer is determined by its effective power, that is, the product of the impact energy and the frequency of strikes. The greater the strength of the material that needs to be destroyed with the help of hydraulic hammer is, the greater influence on productivity is caused by the impact energy. The impact energy of the hydraulic hammer must imply the destruction of the treated material for no more than 15-30 seconds.

Hydraulic hammer must be pressed to the oversized material with the help of hydraulic cylinders of working equipment to direct the resultant force of pressing along the axis of the hammer, which reduces the radius of an excavator operation.

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STUDY OF THE MASSIF FRACTURING AT GOLOVINO LABTADORITE DEPOSIT

Mineral composition of labradorite, the basic systems of cracks, full specific fracturing, and the output of blocks from rock mass at State Enterprise "Golovinsky quarry" are considered.

Introduction. Fracturing of rocks is one of the parameters that determine mineral resources and affect the operation of the field. Fracturing is one of the factors that determine the differences between the mechanical properties of rocks in a sample and in a massif.

The natural fracture of the rock during the exploitation of mineral deposits is supplemented by technogeneous fracturing, which, in turn, depends on the methods of driving the drilling and blasting. It occurs as a result of an explosion in massif. At the same time, with the increase of the magnitude and diameter of the charge, the fracture and the degree of fracture openings increase.

All types of fractures in one way or another affect the process and quality of drilling and blasting operations. This is primarily due to the fact that at the initial stage

fractures divide the solidity of massif into separate parts. Fractures can contain water or debris of weathered rocks and affect the rate of propagation of shock waves during the explosion. Results of experiments show that the part of energy transferred by wave, when meeting fractures, is spent on the grinding of the material on its boundaries, and the second part of the energy goes in the direction of the free surface.

Materials. Labradorite, is a premium facing stone consisting of practically one plagioclase, a regular labrador. The structure of labradorite, as a rule, is morphicacinozious; the texture is trachydoid or massive; the color can have spectrum from white to black. Irisation of plagioclaseis often observed.

Golovyno field has deposits of dark gray to black labradorite. The mineralogical composition is represented by plagioclase (60-100%), pyroxene (up to 40%), olivine (up to 30%), potassium spar (up to 3%), and quartz (up to 7%).

Results. Golovyno deposit is characterized by significant fracturing. In the entire period of the deposit exploitation, rock fracturing was studied during all geological explorations.

The obtained data show that 3 basic systems of fractures can be distinguished within the field. The data are summarized in the table (1):

Basic systems of fractures in the quarry:

Table 1

№	System of fractures	Stretch azimuth°			Stretch angle°			The average distance between fractures
		from	to	shift	from	to	shift	
1	2	3	4	5	6	7	8	9
1.	Longitudinal (S)	275	315	305	70	90	85	2,5
2.	Transverse (Q)	7	57	30	75	90	85	2,0
3.	Plast (L)	-	-	-	-	-	10-30	1,7

According to the prospecting data, the total specific fracturing of labradorites varies from 0.11 to 4.01 m / m². The average fracturing for the deposit is 1.18 m / m². Labradorite of Golovino deposit is characterized by weak fracturing and large blockiness, and the maximum linear dimension of the block in the massif is 4.0 m; the average value is 1.8 m with fluctuations from 0.7 to 2.7 m.

According to the company data, the output of blocks for the last 5 years is 23.5%. Taking into account the entire complex of data on decorative properties of labradorites in Golovyno deposit, there can be distinguished following varieties: highly decorative, decorative and non-decorative.

Taking into account the properties of rock and the nature of its exploitation, as well as to increase service durability of products, Golovyno labradorite should be used for interior, floor and stairs lining.

Conclusions. Tectonics of the deposit is rather complicated. Comprehensive analysis of materials allowed to decipher the structure of the deposit and to allocate the following levels of primary and tectonic fracturing:

- 1) joints – primary fracturing, tectonic fractures;

2) narrow extended zones of high fracturing; tectonic seams of the northwest stretch with a slight displacement along their faulting zone;

3) wide linear zones of increased fracturing of the northeastern and northwest directions which control the position and orientation of the areolas of hydrothermal-metasomatic changes of labradorites.

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STUDY OF THE BASIC PROCESSES OF PRODUCTION OF BALLS FROM NATURAL STONE

Natural stone is widely used both in construction and in manufacture of ritual purpose products. Monuments from granite look aesthetically and mournfully. Perfect addition to them are vases, balls, and lamps, which are currently in great demand. Ball is one of the most popular natural stone products. It is widely used in decoration of tombstones, monuments, memorials, fences. Balls of large shapes are often used as elements of fountains, where a perfectly round granite ball rotates under water pressure. Balls are also used for decoration of flower beds, premises or public places, gardens and parks. They can be used as decorative elements on fences as well. Structurally, they can be made both in the form of a classical ball, and in the form of a ball with a leg - a support. The second type of such products is more common and popular. Every year the volume of production of complex geometry products increases, therefore, the question arises in a more in-depth study of the process of manufacturing such products and optimizing certain parameters.

Complex profiling is performed by special machine tools. Most often they are turning-screw-type machines of type 1M63, 1E61M, DIP 200 and others, which are transformed from metal-working on stone-processing, where the working body is not a cutter, but a diamond cutter, less often a cutting disk. Such machines correspond to the artisan production conditions.

In this work, an example of production of the ball from gabbro with a height of 150 mm and a diameter of $\varnothing 120$ mm is considered. The production of the ball begins with the marking of the end pieces of the workpiece. It is necessary to find the center at the intersection of the workpiece diagonals or midpoints of the sides. After that, in the planned centers a hole with a depth of 6 - 10 mm is drilled with a hammer drill with diameter 6 - 8 mm. After verifying the serviceability of the machine and all its working elements, the workpiece is fixed for further processing. The technology of manufacturing a ball from natural stone can be divided into 3 stages:

Stage of cutting - this stage includes preparatory operations (placing a copy template in accordance with the maximum diameter of the future product: for a ball of $\varnothing 120$ mm with a polishing tolerance of 1 ... 2 mm, and one end of the workpiece) and cutting the ball all over the length of the workpiece with a cutting step of 5 mm (the step is chosen depending on the chosen cutting method); (Fig.1)

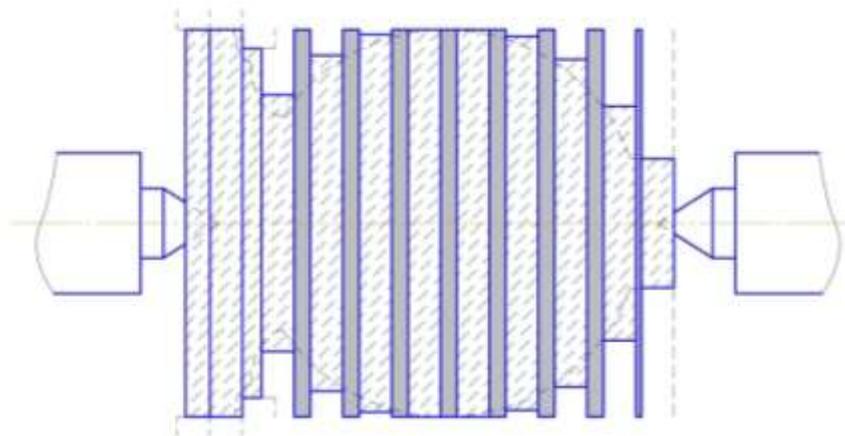


Fig.1 Ball view during cutting

1. *Whipping and pre-cleaning* - this stage involves whipping and pre-cleaning, the operator performs hammer whipping. For effective knocking, the direction of the chip and the applied force must be taken into account. These factors influence the height of the unevenness of the slotted grooves. Therefore, they are carried in the direction of reducing the diameter of the product. For example, in a convex section (in the middle), the diameter is the largest, and at the leg - the smallest, meaning they should be whipped from right to the left. In this case, we get a smaller height of the inequalities without breaking the shape and the integrity of the workpiece. Otherwise, when the whipping is from left to right, the height of the irregularities is larger, and there is also a chance that during the whipping the pieces of the rock will break off with the groove. Also, the width of the grooves influences on the height of the inequalities of the whipped grooves. Fig. 2 shows the recommended directions for chipping. Fig. 3 shows the shape of the ball after the ribs have been cut. Fig. 4 shows

the shape of the ball after the previous cleaning.

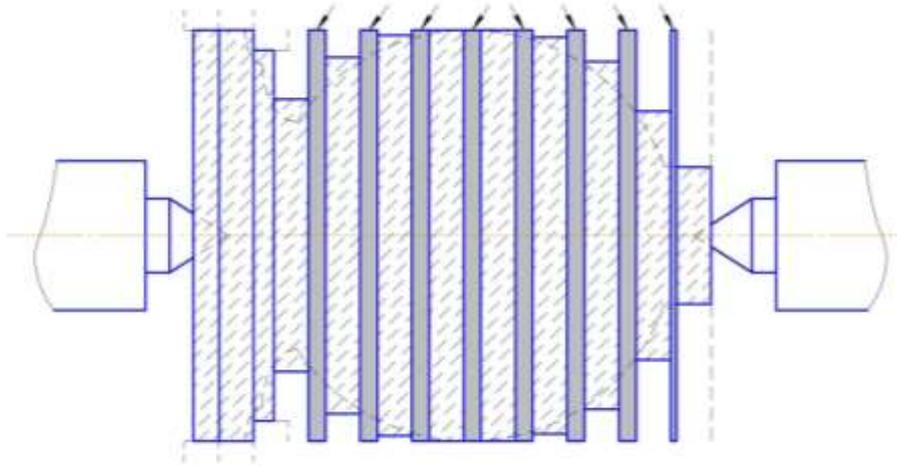


Fig. 2. Recommended directions for whipping

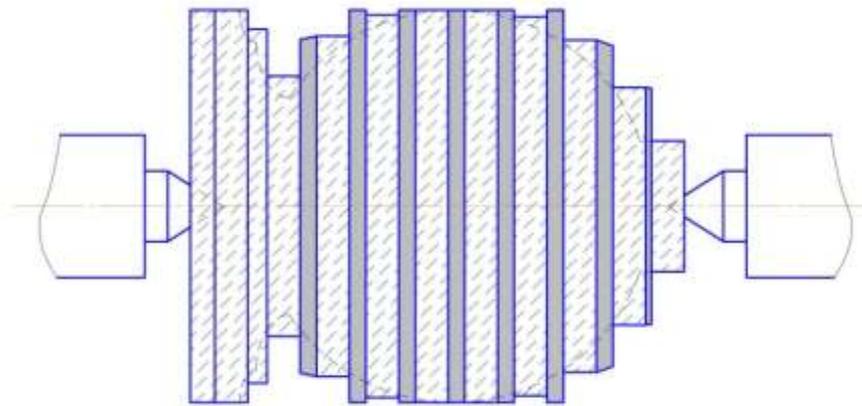


Fig. 3. The look of the ball after whipping.

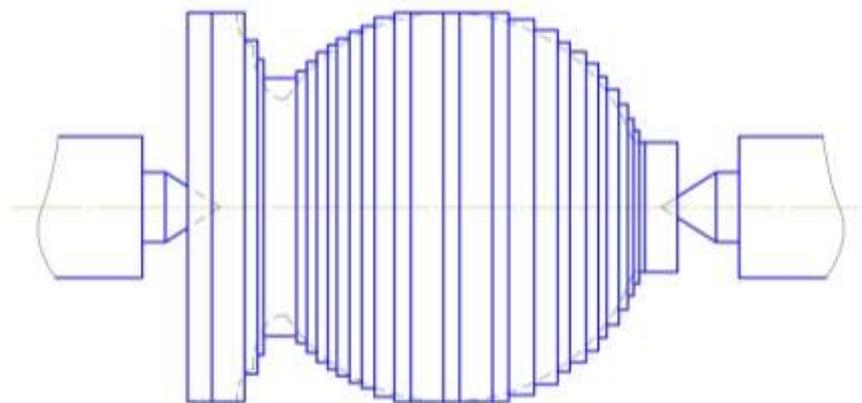


Fig. 4. Ball appearance after preliminary cleaning.

2. The *main cleaning* step is to clean up the ball at 1 ... 2 mm intervals and to provide the final shape of the product before polishing. Therefore, we get the inequality of the surface of the ball, which will wear out fewer tools while polishing. When one step more is made than 2 mm when stripped, the tool wear,

the time spent on polishing and grinding increase almost twofold. Fig. 5 shows a sample of the ball after the main cleaning with a step of 1 ... 2 mm.

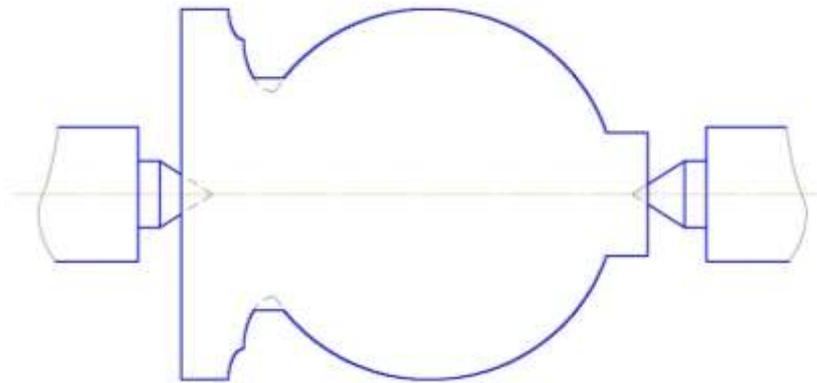


Fig. 5. Ball appearance after the main cleaning

For ball milling the operator must:

1. Soak the workpiece in the water to detect defects in the form of cracks, inclusions, etc.;
2. After selecting the suitable (appropriate) workpiece, attach it to the machine;
3. Choose the right method of cutting a vase, which includes the width of the ribs and a tolerance of 3 ... 10 mm when cutting, proceeding from the physical and mechanical properties of the selected breed;
4. During the second stage of making the ball - *whipping and pre-cleaning* - to choose the direction of the cleavage of the ribs correctly to obtain the minimum height of the roughness without compromising the integrity of the workpiece. Calculate the force of impact by hammer on ribs;
5. Observe the width of the step of 1 ... 2 mm during the *main cleaning*.

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DEPENDENCE OF DISK CUTTING PROCESS ON THE CONTORTION OF THE PLATFORM RACK PROFILE ON THE EXAMPLE OF PE «PSIUKIVSKYI O. Y.»

Natural stone processing is the one of the leading industries in Zhytomyr region. The region is characterized by surface location of raw material base and rich deposits of a quality block stone. It determines high profitability of production. Stone processing, in general, consists of successive operations, such as sawing, grinding, polishing, and slabs bordering [1, p. 24].

One of the main processes is sawing. The most important parameters of sawing operation is the diameter of the machine disk, its power and the value of the working feed [2, p. 10]. The last two parameters and the raw materials characteristics determine the mode of the process of sawing.

The following dependencies (Table 1) between the distortion of the rack path in the horizontal and vertical planes and the power of the machine at the specified stages of sawing the model block were established during the research conducted at the PE «PSIUKIVSKY O. Y.».

It should be noted that the study was carried out on a disk machine with a diameter of 2700 mm and operating capacity of 36 kW (nominal 55 kW). The planned cutting speed is within the range of 18-20 m / s with a cutting depth of 8-10 mm. The length of the track is 6100 mm; the measurements were made from the center of the platform with a frequency of 200 mm.

The conclusions can be made based on the obtained data. First, the distortion has a significant effect on the power of the machine. It follows that increasing the value of the distortion destabilizes the normative value of power and, in turn, worsens the optimality of the cutting process. Secondly, the growth of a positive deviation of power contributes to the increased power consumption of the machine. Thus, the economic losses of the enterprise increase.

To sum up, we can say that the effect of the platform distortion on the parameters of the blocks disk sawing is significant enough. This mainly affects the changes in the power of the machine during the stage of sawing which, in turn, negatively affects the optimality of the cutting process.

The way to solve this problem is to restore surface evenness by racks grinding. This operation eliminates the wavy run-out and short irregularities on the surface of rolling rack in order to reduce the vibrational impact of the platform on the track.

Table 1
Investigation results

Measur	Value X	Value Y	Deflection X	Deflection Y	Observed process	Amperage, A	Power, kW
1	2	3	4	5	6	7	8
1	34,9	5	0,1	-	Idling	35	23,1
2	34,85	5	0,15	-	First touch to stone	42	27,7
3	34,8	4,8	0,2	-0,2	Sawing on half dip	54,7	36
4	34,75	4,6	0,25	-0,4			
5	34,65	4,5	0,35	-0,5			
6	34,6	4,6	0,4	-0,4	Sawing on full dip	54	35,6

7	34,55	4,7	0,45	-0,3			
8	34,5	4,9	0,5	-0,1		57	37,6
9	34,45	5	0,55	-			
10	34,43	5,1	0,57	+0,1			
11	34,44	5,3	0,56	+0,3		56,2	37
12	34,59	5,4	0,41	+0,4			
13	34,63	5,2	0,37	+0,2	Sawing on half dip	50	33
14	34,64	5	0,36	-			
15	34,71	4,6	0,29	-0,4	Sawing on a quarter dip	45,3	30
16	34,75	4,7	0,25	-0,3			
17	34,82	5	0,18	-	Sawng on 1/8 dip	40	26,4
18	34,84	5	0,16	-	Idling	35	23,1

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ANALYSIS OF THE FACTORS THAT INFLUENCE THE OUTCOME OF CRUSHED STONE PRODUCTS

The topicality of the research. Nowadays, the technological parameters of mining operations do not meet the modern requirements imposed by the modern economic market. For example, the design of drilling works is carried out in accordance with the provisions that were developed in the early 1950, based on the mode of fixed percentage content of the original "oversized" in the aggregate pieces of exploded rock.

The cost of crushed stone goods manufacturing consists of the costs of blasting, excavation, transportation and crushing at a crushing and sorting plant. All the mentioned above depends, to some extent, on rock mass cultivating.

Analysis of the study

The nature of the crushing of rocks by the explosion is determined by the general effect of many natural and technological factors that can be divided into two main groups: the first one relates to the physical and mechanical properties and characteristics of the undrawn rock mass, to the other - the magnitude, duration and sequence of stress caused by the explosion. This group of factors also includes the main technological parameters. The change of these parameters can be controlled by the destruction of the rock massif.

The waves of stress occurring in the medium when initiating the charge of explosion are characterized by the following basic parameters: the magnitude of the maximum voltage, the time of increase of the maximum voltage, the duration of the positive voltage phase, the magnitude of the operating voltage, the steep edge, is the magnitude of the relations of the values of the maximum voltage to the time of increase.

Theoretically, the influence of each of the parameters of a stress wave on the level of crushing is determined in different ways in the process of rock destruction by an explosion. The number of fragmented pieces in each part of an array is directly proportional to the strength of a rock on the stretch according to Khanukayev's research.

The analysis of dependencies shows that the medium voltage short pulses of considerable amplitude leads to redistribution of the rock in the zone of adjacent charge, while reducing the maximum stress and increasing the duration of the pulse increases the uniformity of crushing rock massif. Thus, the regulation of the granulometric composition of the exploded rock can be made by changing the magnitude of the maximum stresses and the duration of the existence of a stressed state of the array at a given point. The most effective regulating factors that change the magnitude of the maximum amplitudes of stress waves and the time of their action in an array of rocks are the charge diameter and the type of explosive.

The impact of these factors within a wave model of the explosion in an environment could be easily taken into account in ideal conditions only. The problem of the charge diameter effect and the explosion type is becoming considerably complicated even in case of elastic-plastic model of the medium. But, nevertheless, it can be reduced to the ratio which subordinates the geometric and energy form. It is practically impossible to calculate the determination of impulse parameters in fissile rocks. Therefore, the nature of the influence of a charge diameter and an explosion type on the result of array grinding is usually evaluated qualitatively.

In the works of Boreksov and Sukhanov, the theory of the effect of an explosion in rocks is developed and based on the consideration of various types of resistance to the medium of the explosion. The piston action of detonation products was taken as the main destructive factor. The main experimental material confirming this point of view is represented by the volumes of the destroyed material, the nature of the crushing of which was taken into account by an empirical relation. The influence of the diameter

of the charge and the type of explosion in this model was also determined on the basis of the principles of geometric and energy similarity.

Therefore, the laws that are subjected to the principles of geometric and energy similarity determine the influence of a charge diameter and concentration bulk of explosion and it corresponds to the hydrodynamic and quasistatic models.

These principles are used for the cases of explosions different diameter cylindrical charges. These charges determine the dependence of an explosion on significantly different values of the least resistant reduced line. Correspondingly, it determines the task of studying the effect of different geometrical characteristics of these charges on the efficiency of explosive crushing. The existing quantitative evaluation of the explosive energy fraction used for milling gives fairly approximate and different efficiency values of the explosive crushing ranging from 0.5 to 15%.

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AMBER IN UKRAINE AND THE PROBLEM OF ITS EXTRACTION

Is it really possible to legalize and put amber mining on the industrial flow of the state?

To answer this question, first you need to understand how valuable the sunny stone is and what kind of problem exists with it in our country.

Amber is a natural organic compound, dense and viscous (fossilized) fossil resin of coniferous trees in the form of dim, transparent and semitransparent stones.

It is known to people for several thousand years. Amber became the subject of trading in the Neolithic (6 thousand years ago) and the Baltic amber was especially valued. People were able to colour amber and to make decorations of various shapes from it as early as in the Bronze Age. It was common among Egyptians, Romans and Greeks.

Decorative amber goods (fig.1) were found in the Scythian burial mounds on the territory of Ukraine. According to Pliny, the Romans were able to paint amber in red and such amber was valued as gold. Humanity has valued the sphere of application of



Figure 1

the sunny stone from ancient times. Amber is used for making jewelry, perfumery, in folk medicine and electricity. Secondary littoral coastal-marine deposits have the most industrial significance. Amber Succinate - Fossil Resin from Pine "Pinus Succinator" - covers several areas on the map of locations. Geologically, the Baltic Succinate is most widely used. The same semiprecious stone is also

found on the territory of Ukraine (near Kiev, Kharkiv, in Volyn). There is Amber Succinate in Ukraine, in the deposits of the Paleogene and Neogene in Rivne (Sarny, Volodymyrets and Dubrovytsky regions), Kiev (the Kievan amber is a product of the casual flushing of the fossil resin, that is, this source was not of a permanent nature), Zhytomyr, Lviv and Kharkiv regions. The Great Klesiv deposit (in Polissya) began to develop relatively recently, because succinate here is deep enough. The territory of Ukraine is divided into three amber basins: the Dniester, the Pripyat and the Dnieper. Pripyat is located on the western and northern slopes of the Volyn, Zhytomyr, Rivne and Kyiv regions. Large deposits of Ukrainian amber are located in Polissya, in the Rivne region. Unlike the Rivne region, there is a small amber deposit in Zhytomyr region. Geological situation. The largest deposit of amber in Ukraine is Klenivske deposit in the Rivne region. This deposit is a burial lake-deltaid formation. It is located at the junction of crystalline rocks of the Ukrainian shield and sedimentary rocks of the Volyn-Podilsky plate. On average, up to 1.2 kg of amber are found in one cubic meter of rocks, most often in the form of small peas, but sometimes a few pound pieces can be found as well. Depending on the depth of occurrence of productive aquifers, the potential of both open mine (surface) extraction and the use of non-traditional hydraulic method are great. Both methods of extraction use conveyor pipelines for sewage discharge, after washing the mixture of sand and water in special pits. The extraction of amber by the open method is the most profitable, so it is the most common. In one of the Klesovskoye deposits, amber is extracted in an open way from the ancient riverbed. In a quarry with a depth of 6-10 m, the mining mass is extracted by a mechanical excavation. The amber sand is then transported to enrichment to remove the precious stone from it.

As a rule, amber in Ukraine is extracted in shallow quarries and by illegal methods.

The entangled legal regulation of the use of subsoil, the complexity of the procedure for obtaining a special permit for the use of subsoil, the need for a range of permits, decisions for the beginning of extraction of minerals for a long time frightened potential investors from investing money in the development of amber fields. The increase in the prices of amber in the world market of precious stones, low employment rates in the regions of deposits and corruption, including in law enforcement agencies, a small responsibility for illegal mining, relative cheapness and simplicity of the technology of handmade amber mining due to its near-surface deposition have caused significant scale of the illegal mining of amber.

In response to the illegal extraction of amber, on April 23, 2015, in the first



Figure 2

reading, a draft law of Ukraine "On the extraction and sale of amber" was adopted. However, numerous artisan amber mining did not stop. Illegal control of entire districts by criminogenic

structures, periodic shootings between gangs and the local population, inactivity of law enforcement agencies, continued damage to deposits caused the destruction of ecosystems in the places of illegal amber mining, in particular in Zhytomyr region (Fig. 2).

Amber, for the most depressed rural areas, which are the Polissya villages, can become a base for socioeconomic revival, provided that its in-depth processing is in place, which will increase the share of high-value added products and contribute to the creation of a significant number of new jobs. Deep processing of amber is possible when it is directed to the legal channel of its production.

Public-private partnership can be an effective form of legalization of amber mining, in which the interests of rural communities and the requirements of environmental legislation will be taken into account as much as possible. This is a form of entrepreneurial activity in which one of the partners is a state or a territorial community, and another partner is the subject of entrepreneurial activity. At the same time ownership of natural and natural-economic assets is not transferred to a private partner.

To date, the list of areas of application of public-private partnership agreements in the field of economic use of natural and natural-economic objects is extremely narrow, which does not allow to attract private investment in the sphere of nature use. Today, such areas include water supply and drainage, irrigation systems, and waste management.

That is, the first step towards the implementation of public-private partnership agreements should be the amendment to the Law of Ukraine "On Public-Private Partnership", in particular, it is necessary to attribute amber extraction to the areas of establishment of partnership relations between the state and business entities. The second step should be the determination of the possible forms of amber mining, which include the transfer of land for a temporary use of the forest fund for amber extraction.

The legalization of amber mining will create the preconditions for the construction of enterprises for its processing for the production of export-oriented products, which will have a significant impact on the pace of socio-economic growth of rural areas, especially Polissya. Therefore, the introduction of amber mining into the scope of public-private partnership agreements is perhaps the only way to overcome the investment deficit in the Polissya administrative districts.

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ENSURING OF ACCURACY AT TURNING OF NON-RIGID PARTS

Nowadays, due to ensuring the competitiveness of domestic products both in the domestic and the world market, high standards are imposed on its quality.

Improvement of the quality of machine-building production is associated with the improvement of the technology of its production and the introduction of progressive processing methods into production. Particular attention is paid to ensuring accuracy of processing and giving the surface layer of machine parts with the necessary physical and mechanical properties.

In recent years, as a result of the widespread use of materials with high strength and special properties, a trend has been observed in the machine building industry to reduce metal consumption and the mass of machines, and as a consequence, the formation of a large number of non-rigid parts.

Ensuring the accuracy of non-rigid parts is associated with considerable difficulties due to technological residual deformations. The residual deformations of the parts arise as a result of disturbance of the equilibrium of their stressed state during the technological process and constitute the main part of the total error of processing. Elimination of residual deformations in the manufacture of non-rigid parts has become one of the most important problems in engineering technology [1].

One of the most important technological tasks in the processing of non-rigid parts is to ensure their geometric accuracy. Such typical part is the body of rotation in the form of thin-walled metal bodies.

The low rigidity of such parts is a deterrent in the designation of cutting regimes, which reduces the processing capacity. For the same reason, the permissible wear value of the contact surfaces of tools is reduced. As a result, the potential resource of modern high-priced replaceable polyhedral plates is not fully used, and the cost of processing increases.

To ensure the accuracy of this class of parts, it is necessary to take into account the individual design features of the machined parts. For thin-walled metal bodies such feature is the presence of a concentrically located ring, which by means of 3 bridges rigidly connected with the main body of the part. When turning the inner diameter of 105 mm and cutting the internal thread of the joint venture 105x3 the detail is fixed for the external diameter of 111 mm in 3 cams with special enclosing sectors. This makes it possible to reduce the amount of unavoidable faceting in the cross section of the thin-walled body of the part. Nevertheless, at the first stages when testing the technology for manufacturing this part on a machine tool with a numerical control model 16A20F3S49, the value of this error was reached to 0.1 mm, which exceeds the permissible value, and the defect for this reason was 10%. The technology of this stage

was follows: turning of the thread diameter was carried out in one installation with a change in roughing and finishing passages with the same cutter [2, p.79].

It should be noted that was expected 3 “petal” cut, caused by the application of three-claw chuck but in reality there was 4 “petal” cut. The formation of such shape of cut can be explained as follows. When installing parts in the chuck of the machine are observed its certain angular orientation with respect to one of the three gaps between the cams, against which there is a mark on the end face of the cartridge. This is due to the presence on the opposite end of the parts of three projections, the outer diameter of which is greater than the diameter of 111 mm, along which it is fixed. On the outer diameter of the part, this is not subjected to processing, stamped, located opposite one of the bridges, connecting the outer ring with the body of the part. This stigma serves as a reference mark for the part.

When the part is unfastened after the treatment, it is elastic “recovery”, as a result of which a form error is formed, different from the classical 3 “petal” cut, characteristic after processing of smooth thin-walled rings. To reduce the percentage of rejects, the technology variant described above was revised. The difference was that the roughing and finishing of turning were performed as independent operations. In addition, a time interval of 20-24 hours was introduced between them. Such a holding time promotes a more complete redistribution of residual stresses in the design of the part after roughing and, as a consequence, stabilizes its diametric dimensions.

During fixing the part before finishing turning, a change in the angular orientation was introduced, namely, it was rotated around its axis by 120° clockwise [3, p.60; 4, p.31].

From the data obtained, it follows that the shape error is approximated to a “multi-petal” cut, the maximum value of which is within acceptable limits.

Thus, taking into account the individual features of this part in the development of the technology of its production allowed improving the accuracy of its processing and preserving the reject in terms of cutting to 1%.

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STUDY AND ANALYSIS OF THE ACCURACY OF SURVEYING SUPPORT AND NETWORK DEVELOPMENT

In designing and developing surveying support and networks, the surveying service is obliged to comply with the requirements of regulatory documents, in particular, the Guidelines for surveying works. Thus, an assessment of the accuracy of surveying works, both at the stage of designing the networks and after the completion of works is made. From a wide variety of ways to develop surveying networks, different enterprises and organizations often prefer to make polygon measurements, geodetic crossbearing, geometric and trigonometric leveling.

At the present stage, electron-optical devices, such as electronic tachometers, as well as satellite positioning systems are increasingly gaining in popularity. The use of electronic tachometers allowed the introduction of methods of creating surveying support and networks both on the earth's surface and in the mine. Such methods were not used because of the great complexity and are based on the overall measurement of the lines lengths and corners. The regulatory framework of the surveying service is updated very rarely, and at this stage it lags behind and does not reflect the changes that have taken place in equipping enterprises with modern measuring equipment.

There are many ways to assess the accuracy of surveying networks. They are based on a strict and approximate equation of measurement results. There are software complex programs that allow performing equation computations and evaluate the accuracy of network elements. But these programs are aimed at solving the problem for specific networks, the diversity and quantity of which is large. It is necessary to develop generalized methods for assessing the networks of different types, which would allow comparing them quickly and optimize their design.

According to earlier studies, several methods for analyzing surveying networks were introduced. One of these methods is the method of mathematical modeling of geodetic crossbearing. This method helped to establish that the main types of geodetic crossbearing can be equated to one geometric scheme. Matrix method based on the theory of parametric equation was introduced for the analysis of the accurate positions of the specified points. Also, this method allowed obtaining formulas which are based on determining the parametric equation. It is used for the estimation of the accuracy of angular, linear and linear-angular crossbearings. In the course of the study, the alignment of the reverse angular crossbearing was performed both in corners and in directions. Besides, it was proved that the alignment in directions in the case of circular techniques is provided only after the deducting the directions of the initial direction averaged value from the results of observations.

General formula for calculating the error of the specified point position and the coefficient values for a single and double crossbearings were equated on the basis of conducted analytical studies. It allows carrying out the operative design of geodetic crossbearings during the development of surveying networks.

Having analyzed mentioned above methods, namely, analytical studies and the method of mathematical modeling, the necessary to combine the existing methods for the effective solution of the problem can be substantiated. It can help to determine the position, angular and linear values, as well as to identify errors with greater accuracy.

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AUTOMATIZATION OF THE ACCOUNT OF FINISHED PRODUCT STORES AND DUMPS BY DIGITAL PHOTOGRAMMETRY AND MODELING

Efficiency of work and accurate measurements are the most important indicators in accounting of finished product stores and dumps in modern conditions. Widespread use of terrestrial photogrammetry in conjunction with modern automatic software can reduce time commitment and increase the accuracy, in comparison with traditional accounting of finished product stores and dumps. The main task of automatization is to increase the efficiency of terrestrial photogrammetry as a measurement method by performing an analysis of existing digital surveying techniques and practical skills of work with automatic programs such as Pix4D, Geovast3D, 3Dsurvey, AgiSoft Photoscan. It also important to check in practice the techniques of digital terrestrial surveying for dumps and stores from small distances.

The issue is to conduct theoretical research in the field of applied photogrammetry, which allows developing theoretical basis for technological research of surveying techniques and improving already existing networks of phototriangulation. In conjunction with current software for image processing, it can increase the efficiency of work automatization.

In terrestrial photogrammetric surveying, the accuracy of spatial coordinates determination significantly depends on the large range of changes in the distance between the points and the basis of surveying. For photographing, stations with a good overview of the object are usually selected to have the least number of "dead" zones (when objects of the near-plan are blocking the distant objects) during surveying. In the process, the optical axis of the camera may take different positions relative to the horizon and the base line. The development of the computing power of central and graphics processors over the past decades allows the photogrammetric software to

transform a set of an object (dump) photographs into a three-dimensional model and independently calculate the given parameters (characteristics) without personnel interference. It also helps obtaining accurate results over a short period of time depending on the objects of surveying.

The technique of qualitative photogrammetric surveying of finished product stores and dumps at gravel pits is developed on the basis of the analysis of already existing photogrammetric techniques which considerably simplify the work with photographs. The possibility of introducing the digital methods of surveying at other sites is examined. The expansion of photogrammetry will lead to widespread use of science in construction, architecture, surveying, the construction of 3D models of hard-to-reach objects and obtaining the high-precision results.

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ASSESSMENT OF TECHNOGENIC STRESS ON THE ENVIRONMENT IN ZHYTOMYR BY METHOD OF BIOINDICATION

Bioindication is a relatively simple and comprehensive method of studying the state of the environment. The main advantage of the methods of bioindication is the high sensitivity to environmental violations. Bioindicators are organisms or communities of organisms, whose reactions are observed representatively to evaluate a situation, giving clues for the condition of the ecosystem. In our investigation we consider *Pinus sylvestris* and *Picea abies* as bioindicators because these coniferous trees are quite sensitive to various pollutants and can be observed during all seasons.

To conduct a morphometric indication of environmental quality in Zhytomyr, we used the following instruments:

- 1) Ruler – to measure needles length;
- 2) Caliper – to measure needles width;
- 3) Analytical balance – to weigh 100 needles;
- 4) Magnifying glass – to detect necrotic lesions.

The reaction of conifers to air pollution was investigated at different sites. The samples were selected from three recreational areas in Hydropark (site №1 - its central part; site №2 – footpaths zone; site №3 – the river zone), and from three industrial areas with heavy traffic (site №4 – sports complex "Dynamo"; site №5 – Chudnovska street zone ; site №6 – gas station zone). The results of the study are given in table below.

Table. The main morphometric parameters of needles within the city of Zhytomyr

The sampling site	Species of Conifers	Length of needles, mm	The width of needles, mm	The weight of 100 needles, g	Necrosis	
					%	type of necrosis
Site №1	Pinus sylvestris	65	0,83	1,47	4,8	Apical
Site №2	Pinus sylvestris	64	0,68	1,289	7,7	Apical
Site №3	Pinus sylvestris	63	0,87	2,714	7,8	Apical
Site №4	Picea abies	18	0,82	0,48	3,9	Apical
Site №5	Pinus sylvestris	57	0,7	1,496	8,1	Apical
Site №6	Pinus sylvestris	76	1,09	2,838	9,6	Apical

The comparative analysis of needles morphometrics parameters both in industrial and recreational areas shows that:

- At site №1 the needle damage is 1.7 times less than at site №5;
- At sites №2 and 3 needle damage is 1.2 times less, than at site №6;
- At sites №5 and 6 needle width is 0.1 times is more than at the other sites;
- At sites needles damage is 1.3 times higher than that at the other sites;
- At site №6 the maximum width and length of needles as well as the maximum weight of 100 needles are observed;
- While the least one was observed that weight of 100 needles was the smallest at site №2;
- Picea abies has the smallest part of necromanic needles and all the other parameters (length, width and weight) are also the smallest.

That is, at area №6 which is highest necrosis of needles is the largest length, width and weight of the needles, compared to other areas.

We can conclude that the maximum damage was found at sites №5 and 6 due to intensive industrial and traffic load.

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PLACEMENT OF WELLBORE NET DURING DRILLING WORKS IN A QUARRY

At the present stage of mining development, most of the minerals that are extracted in an open way are prepared for mining through drilling and blasting works (DBW).

According to academician K. M. Trubetskoy, the destruction of rock masses by explosion energy are still the most versatile and effective way, despite the achievements in the field of non-explosive methods of destruction (mechanical, thermal, electric, magnetic). More than 70 per cent of the minerals are mined by explosion energy. The volumes of fragmented and moved by explosions rock mass reach millions of cubic meters per year.

Drilling and blasting works at mining enterprises are one of the main operations in preparing rocks for mining. An increase of tough rocks in percentage, as well as the influence of the quality of fragmented rock on technological processes such as excavation, transportation and primary shredding, causes an increase of total expense of drilling and blasting works. The quality of a mass explosion in the fields of industrial minerals is characterized by equability of rock fragmentation. First of all, it is necessary to meet the requirements of raw stock quality, lumpiness and the degree of rocks looseness by choosing a set of technical and organizational decisions. Therefore, in order to achieve effective fragmentation and minimum displacement of rock masses, it is necessary to ensure the transfer of the maximum explosion energy to the environment.

Surveying support, which contains a considerable amount of field and camera works, is necessary for drilling works in quarries of industrial minerals. It includes surveying of massif prepared for explosion, carrying out project of drilling works with given parameters of a wellbore net, the control of the actual position of drilled wells and surveying of blasted mountain mass.

Rock blasting on banks occurs in separate blocks. Their sizes depend on the location of wells, the number of well sets of wellbore net parameters, and the need for achieving good technical and economic indicators of drilling and blasting works. The choice of a single or multi-set well placement is determined by the width of the work area, the quality of fragmenting and underworking of banks bottom. With multi-set placement of wells, their net may be rectangular or square, the distance between the sets of wells is equal to the distance between the wells in a set or in a chess order.

Nowadays chess net location of wells for mine blocks during blasting operations is used quite rarely. In spite of the fact that in some cases they are quite good regulators of the effective holding-up depth check, other approaches are used mainly to improve the quality of preparation of rock mass mining. There are several reasons for it.

Drilling using chess net requires precise positioning of the machine on the block surface, as well as a clear sequence of transition between wells. Simultaneous non-compliance with these conditions results in a big amount of refused material in the process of blocks drilling (the distances between wells are not followed), as well as the dumping of wells during transitions from wells to wells.

As a result, if square net is drilled with less amount of refused material, than the preference is given to chess net, although in reality this problem is not technological, but organizational.

Appropriate scientific and theoretical direction has been development.

In short delayed blasting, when adjacent charges in sets explode simultaneously, the energy of blasting pulse often is not enough to allow cracks around the hollows developing to a certain size for the massif to be destructed. This is primarily due to significant output of lump when destructing large blocks of rocks. When initiating charges, it is necessary to create conditions in which they either work independently of each other or grouped at distances which exclude the interaction of tension fields with appropriate delay between groups. In the first case, the problem of the effective value of the delay interval is solved in accordance with the scheme of initiation and properties of rocks; and the scheme of installation of the net surface should ensure the reduction of probable untimely actuation of charges.

In the second case, the task of blasting under uniform energy distribution of charges in massif is solved, which leads to a diagonal scheme with increased distances between simultaneously initiated charges.

The above-mentioned factors give grounds to consider that the use of conditionally chess nets for placing wells provides for the creation of a rational direction for initiating charges to improve the quality of rock fragmentation.

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RADIOAKTIVE VERSCHMUTZUNG DER HAUPTWALDARTEN IN POLISSYA

Durch den Unfall von Tschernobyl in der Ukraine wurden mehr als 4 Millionen Hektar verunreinigt Wälder. Davon wurden 157 Tausend Hektar wegen der hohen Verschmutzung aus dem Wirtschaftskreislauf abgezogen. Von den untersuchten 3,6 Millionen Hektar Wälder 1,5 Millionen Hektar haben eine Verschmutzungsdichte von mehr als 1 Ki/km². Die größten Waldflächen, die verschmutzt sind, sind in Zhytomyr - 974,3 Tausend Hektar, Rivne - 728,8 Tausend Hektar, Tschernihiw - 725,5 Tausend Hektar und Kyiv Gebiete - 416,4 Tausend Hektar. In Polissya ist mehr als 60 Tausend Hektar eine Zone, wo alle forstwirtschaftlichen Aktivitäten verboten sind. Etwa 140 Tausend Hektar Holz werden mit bestimmten Einschränkungen verwendet, und die Fläche von über 1140 Tausend Hektar ist verboten, um nicht-Holzprodukte zu sammeln. Der Großteil der radioaktiven Strahlung sind langlebige ¹³⁷Cs und ⁹⁰Sr. Aus diesem Grund wurden die Wälder als «kritischer Bereich» im Hinblick auf die mögliche Strahlungsbelastung definiert, wenn sie in ihnen bleiben oder wenn sie Waldprodukte verwenden.

Das Waldökosystem ist ein spezieller Ökosystemtyp, der Radionuklide festhält. Der Wald kann die Migration von Radionukliden auf globaler Ebene beeinflussen. Radionuklide, die sich unter dem Einfluss atmosphärischer Niederschläge und infolge fallender Blätter auf den Bäumen der Bäume ablagern, wandern in den Waldstreu und Humus-Eluvial-Horizont (bis zu einer Tiefe von 10 cm) und sind an den grundlegenden bioökologischen Prozessen beteiligt. Durch die Zersetzung des organischen Niederschlags kommt es zu einer allmählichen Vertiefung der Radionuklide im mineralischen Teil des Bodens. Eine sehr wichtige Rolle für die Geschwindigkeit der vertikalen Wanderung spielt der Feuchtigkeitsgrad der Böden. Mit zunehmender Feuchtigkeit nimmt die Intensität der Wanderung von Radionukliden in ihnen zu. Dementsprechend ist der ¹³⁷Cs-Gehalt im Holzbett erhöht. Ein wichtiger Faktor bei der Umverteilung von Radionukliden zwischen der Waldstreu und dem mineralischen Teil des Bodens ist die Zusammensetzung der Pflanzung [2, c.15].

Deshalb werden Radionuklide für eine lange Zeit eine ständige Quelle der Strahlungsgefahr sein. Nach der Notaufnahme hat sich die Strahlungssituation in Wäldern infolge des Zerfalls von Radionukliden und deren Einbindung in den biologischen Kreislauf stabilisiert und verbessert. In den folgenden Jahren wird dieser Trend beibehalten. Die Grundlage der Bodenbedeckung der Polissya der Ukraine sind sodenreiche und stark podzolische Böden, Torf- und Torfböden, schwach

humushaltiger Sand. Wegen solcher Merkmale ^{137}Cs , die im Boden hauptsächlich durch die Art der Notabsorption befestigt wird und durch Humus und Lehmfraktionen befestigt wird, wird durch die hohe Wanderung, Fähigkeit und biologische Verfügbarkeit unter den Bedingungen der ukrainischen Polissya charakterisiert.

Die Anhäufung von Radionukliden durch Baumarten wird durch die Art der Waldvegetation und die forstlichen Eigenschaften von Plantagen bestimmt. Merkmale der radioaktiven Kontamination von Gebieten, Migration von Radionukliden in Waldökosystemen. Biologische Besonderheiten der Holzarten, Spezifität der Physiologie von jedem von ihnen, Verlangen nach Feuchtigkeit und Bodenfruchtbarkeit, Anpassungsfähigkeit und Anspruch auf einen Komplex von Umweltfaktoren - Fruchtbarkeit und Bodenfeuchte. Zum Beispiel in Kieferholz sammelt weniger Radionuklide als in Holz von Tanne, Espe, Eiche, Kalk, Birke, Erle [1, c.169].

In der gigotopnoi-Reihe nimmt die Kontamination von Geweben und Organen von Pflanzen von frischen zu feuchten Bedingungen zu, und in der trophischen Reihe (von Bor zu Dornen) dagegen - nimmt ihre Kontamination ab. Der Gehalt an Radionukliden in den Holzschichten nimmt von der Peripherie zum Zentrum des Fasses hin ab. Die spezifische Aktivität von ^{137}Cs in Eichen- und Espenholz ist 4-5 mal niedriger als bei Kiefern und Birken. In der Rinde akkumulieren Radionuklide in 20-30 mal mehr als im Holz selbst. Durch die spezifische Aktivität von ^{137}Cs in der äußeren Kruste und der inneren Kruste der Kruste bilden sich zwei verschiedene, fast entgegengesetzte Reihen. Die Verunreinigung des inneren Teils der Rinde der Baumart wird durch folgende Arten reduziert: Kiefer - Birke - Espe - Eiche, und Verschmutzung des äußeren Teils der Hirnrinde - in der Reihe: Eiche - Espen - Kiefer - Birke. Pinienkiefer und Espen sammeln ^{90}Sr in Holz mehr als Birke und Erle. Darüber hinaus ändert sich dieser Trend in Abhängigkeit von der Dichte der radioaktiven Kontamination des Bodens geringfügig [3, c. 25]

Die Forscher haben bewiesen, dass der Grad der radioaktiven Kontamination von Geweben und Organen von Holzarten vom Alter der Pflanzungen abhängt. Zum Beispiel ist die Akkumulation von «Tschernobyl» ^{137}Cs in den Baumarten der jungen Kiefer 2,5 Mal höher als die von alten Bäumen, das heißt, die höhere Akkumulationsintensität ist charakteristisch für junge Bäume. Viel Konzentrationen sind in ^{137}Cs in photosynthetischen Organen (Blättern, Nadeln) sowie in jährlichen Schritten konzentriert. Die spezifischste Aktivität ist charakteristisch für die Tannennadeln, weiter mit Verminderung – für Birkenblätter, Erle, Eiche, Espe, unter optimalen Bedingungen wachsen [1, c. 174]

Somit hängt die Anreicherung von Radionukliden in den Geweben und Organen verschiedener Baumarten von ihren biologischen Eigenschaften, Arten und ihrem Alter ab, und es wurde auch festgestellt, dass sich die Holzarten in der Kontamination jeder der Komponenten der Phyto-Masse unterscheiden. Solche Kenntnisse sind für die wirtschaftliche Nutzung von Holz erforderlich, das in Plantagen unterschiedlichen Alters während der Forstwirtschaft geerntet wird.

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ELECTRO-EROSIVE CUTTING OF METAL

Electro-erosive machining is one of the ways to change the dimensions and shapes of metal and alloy workpieces. Basically, during this treatment, a through or blind perforation is formed in the body of the workpiece.

The shape of the body can be from the classical circle to the complex polygon. Electro-erosive machining can also speed up the process of forming grooves under the key, slots of any shape, shaped planes and other elements that are extremely difficult (or impossible) to form by traditional cutting.

In a word, in some circumstances, electro-erosive machining of metals is the only possible and most accurate technology.

The essence of electro-erosive machining is to use the destructive energy of the arc “breakdown” between the cathode and the anode. Electric arc separates the crystal lattice of the processed preparation (in analogy with erosion). In this case, the frequency varies from 5 kHz to 0.5 MHz [1].

The process of electrical “erosion” is fully controlled by computers, which allows to guarantee both high productivity and high accuracy of such processing, since the part itself is one of the electrodes. However, the quality and productivity of the process of electro-erosive machining depends on the frequency and power of the pulses applied to a pair of electrodes.

Therefore, in the process of metal working, there are several variants:

1. Anodic-mechanical version of electric erosion, based on arc cutting with parallel removal of waste from the working area. With the help of this technology, it is possible not only to cut the workpiece, but also to grind its surface or to sharpen the

edges under the required angle. This method of arc processing is used in the process of production of a classical metal-cutting tool.

2. Electropulse variety of arc erosion. This process is characterized by maximum productivity but does not guarantee high quality of the machining surface. Therefore, electrical and pulsed equipment is used only for roughing metals.

3. An electrocontact method of forming a new relief of a part that is realized in a liquid medium, which gives the technologists additional advantages associated with the ability to control the temperature in the zone of electroerosive destruction.

4. Electrospark technique is used in the process of high-precision erosion machining of the smallest metal parts.

In addition, all four processing methods give one more positive result – they increase the surface hardness of the processed billet without changing the other characteristics of the metal [2].

In the process of electro-erosion machining, two electrodes are involved – the metal part and the bar of a hard material that is not subject to the process of electrical erosion. In most cases, hard electrodes are made of tungsten, which is made with various additives, or from commercially pure graphite. However, electrodes made of copper, brass and even aluminum are also used in work.

The polarity connection circuit in the pair “workpiece-cutting electrode” can be direct and reverse. In the first case (direct polarity), the charge is supplied with a positive charge, in the second case – with negative.

This selectivity is due to the uneven distribution of energy in the anode-cathode pair: the anode melts at lower frequencies, and the cathode at higher frequencies.

It is possible to achieve greater productivity with a sufficiently high quality of the machining surface by regulating the current connection scheme and the frequency characteristics of the pulse.

In addition, reverse or direct polarity allows to save the material of the cutting electrode, reducing the cost of the process of electro-erosion machining [3].

The first examples of EDM (electrical discharge machining) machines appeared in the mid-1940s in the USSR. The first numerical control machine tool was created in the early 1960s in Switzerland.

Modern machines allow solving both mass, and small-scale or single tasks as aesthetic (grinding, decorating, etc.) and practical (perforation of through and blind holes, grooving, sharpening of cutting tools). And with those, and with other purposes, the EDM machines are able to cope with the same efficiency [4].

The cost price of processing on such equipment is much lower than on classical metal-cutting machines. And the quality of the surface is sometimes simply unattainable for machines from the conventional group.

Therefore, EDM machines are used to create high-precision parts used in the aerospace, instrumentation, machine tool, automotive, and other industries [5].

Unfortunately, this technology is rarely used in industrial technologies, in addition to the aerospace industry, although it is more accurate and profitable at cost.

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REDUCTION OF ^{137}Cs CONTENT IN MUSHROOMS WHEN BOILING

Consumption of forest products, especially wild mushrooms, contributes to an increase of internal exposure dose of people in radioactive contaminated areas of Ukrainian Polissya.

The purpose of our research was to study the reduction of ^{137}Cs content in mushrooms when boiling. The research was conducted on the territory of the State Enterprise "Narodychi Specialized Forestry". Specimens of *Cantharellus cibarius* were sampled by the route method. ^{137}Cs specific activity in these samples was measured using gamma spectrometer in the radioecological laboratory in ZSTU. Measurement error did not exceed 5%.

Before measuring the ^{137}Cs specific activity the mushrooms were cleaned from soil particles and other remnants and thoroughly washed. Boiling of chanterelles was done with 5 minute intervals and a regular change of water.

The duration of boiling was divided in 3 stages:

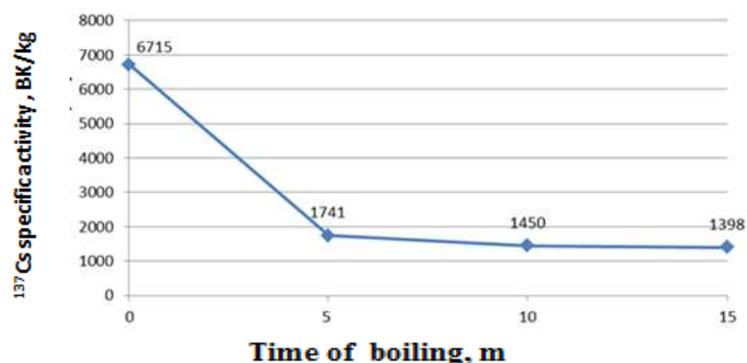
Phase 1 – - the first 5 minutes of boiling;

Phase 2 – - 10 minutes of boiling;

Phase 3 – - 15 minutes of boiling.

The result of the study are shown in the figure below.

^{137}Cs content change in mushrooms when boiling



The data obtained show that maximum reduction of ^{137}Cs specific activity in mushrooms is observed after Phase 1 and is 4 times (26%) compared with the initial value. The further boiling did not significantly affect the content of ^{137}Cs .

It was established that boiling of mushrooms reduced ^{137}Cs specific activity by 4.8 times.

In Phase 2 and Phase 3 there was an insignificant gradual reduction of ^{137}Cs content in mushrooms. A great amount of ^{137}Cs passed into a broth. It shouldn't be used as food because it is harmful for health.

Session work №2

CURRENT RESEARCH IN THE FIELD OF INFORMATION COMPUTER TECHNOLOGIES

UDC 530.145.63: 004.45

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QUANTUM COMPUTING: CHALLENGES AND PERSPECTIVES OF DEVELOPMENT

Quantum computers are incredibly powerful machines that take a new approach to processing information. Built on the principles of quantum mechanics, they exploit complex and fascinating laws of nature that are always there, but usually remain hidden from view. By harnessing such natural behavior, quantum computing can run new types of algorithms to process information more holistically. They may one day lead to revolutionary breakthroughs in materials and drug discovery, the optimization of complex manmade systems, and artificial intelligence. We expect them to open doors that we once thought would remain locked indefinitely [5].

As of 2018, the development of actual quantum computers is still in its infancy, but experiments have been carried out in which quantum computational operations were executed on a very small number of quantum bits. Both practical and theoretical research continues, and many national governments and military agencies are funding quantum computing research in additional effort to develop quantum computers for civilian, business, trade, environmental and national security purposes, such as cryptanalysis. A small 20-qubit quantum computer exists and is available for experiments via the IBM quantum experience project. D-Wave, a company based in Vancouver, Canada, has been developing their own version of a quantum computer which uses annealing.

Large-scale quantum computers would theoretically be able to solve certain problems much more quickly than any classical computers that use even the best currently known algorithms, like integer factorization using Shor's algorithm (which is a quantum algorithm) and the simulation of quantum many-body systems. There exist quantum algorithms, such as Simon's algorithm, that run faster than any possible probabilistic classical algorithm. A classical computer could in principle (with exponential resources) simulate a quantum algorithm, as quantum computation does not violate the Church–Turing thesis:202. On the other hand, quantum computers may be able to efficiently solve problems which are not practically feasible on classical computers.

Until recently, it seemed like Google was leading the pack when it came to creating a quantum computer that could surpass the abilities of conventional computers. In a Nature article published in March 2017, the search giant set out ambitious plans to commercialize quantum technology in the next five years. Shortly after that, Google said it intended to achieve something it's calling 'quantum supremacy' with a 49-qubit computer by the end of 2017.

Now, quantum supremacy, which roughly refers to the point where a quantum computer can crunch sums that a conventional computer couldn't hope to simulate, isn't exactly a widely accepted term within the quantum community. Those skeptical of Google's quantum project – or at least the way it talks about quantum computing – argue that supremacy is essentially an arbitrary goal set by Google to make it look like it's making strides in quantum when really it's just meeting self-imposed targets.

Whether it's an arbitrary goal or not, Google was placed to the supremacy post by IBM in November 2017, when the company announced it had built a 50-qubit quantum computer. Even that, however, was far from stable, as the system could only hold its quantum microstate for 90 microseconds, a record, but far from the times needed to make quantum computing practically viable. Just because IBM has built a 50-qubit system, however, doesn't necessarily mean they've cracked supremacy and doesn't mean that they've created a quantum computer that is anywhere near ready for practical use.

Where IBM has gone further than Google, however, is making quantum computers commercially available. Since 2016, it has offered researchers the chance to run experiments on a five-qubit quantum computer via the cloud and at the end of 2017 started making its 20-qubit system available online too.

But quantum computing is by no means a two-horse race. Californian startup Rigetti is focusing on the stability of its own systems rather than just the number of qubits and it could be the first to build a quantum computer that people can use. D-Wave has already created what it is calling a 2,000-qubit system although many researchers don't consider the D-wave systems to be true quantum computers. In February 2018 the company announced that it had found a way of fabricating quantum chips from silicon, which would make it much easier to produce chips using existing manufacturing methods [4].

In nature, physical systems tend to evolve toward their lowest energy state: objects slide down hills, hot things cool down, and so on. This behavior also applies

to quantum systems. To imagine this, think of a traveler looking for the best solution by finding the lowest valley in the energy landscape that represents the problem.

Classical algorithms seek the lowest valley by placing the traveler at some point in the landscape and allowing that traveler to move based on local variations. While it is generally most efficient to move downhill and avoid climbing hills that are too high, such classical algorithms are prone to leading the traveler into nearby valleys that may not be the global minimum. Numerous trials are typically required, with many travelers beginning their journeys from different points.

In contrast, quantum annealing begins with the traveler simultaneously occupying many coordinates thanks to the quantum phenomenon of superposition. The probability of being at any given coordinate smoothly evolves as annealing progresses, with the probability increasing around the coordinates of deep valleys. Quantum tunneling allows the traveller to pass through hills – rather than be forced to climb them – reducing the chance of becoming trapped in valleys that are not the global minimum. Quantum entanglement further improves the outcome by allowing the traveler to discover correlations between the coordinates that lead to deep valleys.

The D-Wave system has a web API with client libraries available for C/C++, Python, and MATLAB. This allows users to access the computer easily as a cloud resource over a network.

To program the system, a user maps a problem into a search for the “lowest point in a vast landscape,” corresponding to the best possible outcome. The quantum processing unit considers all the possibilities simultaneously to determine the lowest energy required to form those relationships. The solutions are values that correspond to the optimal configurations of qubits found, or the lowest points in the energy landscape. These values are returned to the user program over the network.

Because a quantum computer is probabilistic rather than deterministic, the computer returns many very good answers in a short period of time – thousands of samples in one second. This provides not only the best solution found but also other very good alternatives from which to choose.

D-Wave systems are intended to be used to complement classical computers. There are many examples of problems where a quantum computer can complement an HPC (high-performance computing) system. While the quantum computer is well suited to discrete optimization, for example, the HPC system is better at large-scale numerical simulations [2]

Researchers have taken an important step toward the long-sought goal of a quantum computer, which in theory should be capable of vastly faster computations than conventional computers, for certain kinds of problems. The new work shows that collections of ultracold molecules can retain the information stored in them, for hundreds of times longer than researchers have previously achieved in these materials.

These two-atom molecules are made of sodium and potassium and were cooled to temperatures just a few ten-millionths of a degree above absolute zero (measured in hundreds of nanokelvins). The results are described in a report this week in *Science*, by Martin Zwierlein, an MIT professor of physics and a principal investigator in MIT's Research Laboratory of Electronics at the MIT-Harvard Center for Ultracold Atoms.

Many different approaches are being studied as possible ways of creating qubits, the basic building blocks of long-theorized but not yet fully realized quantum computers. Researchers have tried using superconducting materials, ions held in ion traps, or individual neutral atoms, as well as molecules of varying complexity. The new approach uses a cluster of very simple molecules made of just two atoms.

The molecules have three key characteristics: rotation, vibration, and the spin direction of the nuclei of the two individual atoms. For these experiments, the researchers got the molecules under perfect control in terms of all three characteristics – that is, into the lowest state of vibration, rotation, and nuclear spin alignment.

“We have been able to trap molecules for a long time, and also demonstrate that they can carry quantum information and hold onto it for a long time, – Zwiernick says, and that, one of the key breakthroughs or milestones one has to have before hoping to build a quantum computer, which is a much more complicated endeavor.”

The use of sodium-potassium molecules provides a number of advantages. For one thing, the molecule is chemically stable, so if one of these molecules meets another one they don't break apart [3].

Talking about other researches, now scientists are conducting a series of detailed experiments to try and find out how the quantum computer works.

It's easy to think of computers and brains as similar – both process information, and make decisions, and deal with inputs and outputs. But some scientists think the incredible complexity of the brain can only be explained by quantum mechanics.

In other words, phenomena like quantum entanglement and superposition, all the knotty stuff of quantum physics, are actually regular occurrences inside our brains. Not everyone is so sure, but we might be about to get an answer either way.

Other experiments will look at the potential for decoherence, which happens when the links and dependency between qubits – the idea of quantum entanglement – start to break down. For our brains to be quantum computers, there must be a built-in way that our biological qubits are shielded from decoherence.

Yet another experiment is going to investigate mitochondria, the cell subunits responsible for our metabolism and sending messages around the body. It's possible that these organelles also play a significant role in qubit entanglement.

“Quantum computing processes could eventually help us explain and understand the brain's most mysterious functions, like the way we hold on to long-term memories, or where consciousness, emotion, and awareness actually come from”, – says one of the team, Matthew Fisher from the University of California, Santa Barbara [1].

So, as we can see, scientists are actively working on the creation of a supercomputer of the future and are testing them for efficiency. It is difficult to predict in advance the technical breakthrough and in which branches of science people will make a new technical leap. But, of course, this day will come sooner or later.

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MICROPROCESSOR CONTROLLER OF THE WATER SUPPLY SYSTEM OF A PRIVATE HOUSE

Quality water supply is an important task both for the industrial sector and for creating comfortable living conditions in private houses and apartments.

Comfort is cosiness, convenience (a set of household facilities). This interpretation is present in almost all information sources.

One of the factors that can significantly affect comfort in everyday life is water supply.

Quality water supply provides support for constant water pressure in the pipeline system, regardless of the volume of consumption.

This enables:

- to simultaneously use water at several water outlet points without a substantial influence on each other;
- to use equipment for water heating;
- to use home appliances, which have a requirements to water pressure in the pipeline system;
- to prevent equipment failure due to overpressure;
- to vary the pressure in the pipeline system for maximum comfort;
- to prevent the inconvenience when the pressure differential during rush hour.

There are various ready-made technical solutions for the organization of comfortable water supply. The main ones are:

- pump stations with pressure switch;
- pump stations with frequency converter.

A pump station with a pressure switch is a device that includes a pump, a pressure switch and a hydraulic accumulator. The pump is controlled by the relay law: switching when the pressure drops to the lowest limit and switching-off after reaching

the upper limit. Most often, such devices are limited to a small adjustment range. In this case, it is mandatory to use a hydraulic accumulator in the system, which serves to compensate for the hydroblow and is able to accumulate a water reserve to reduce the number of on / off cycles.

The advantages of such solutions are:

- ✓ low price;
- ✓ ready-made solution.

Among the drawbacks should be noted:

- ✗ high noise level while working;
- ✗ the equipment takes up a lot of space;
- ✗ the presence of frequent on / off switching while active use of water;
- ✗ low lifetime because of the frequent switchings;
- ✗ noticeable pressure jumps while active use of water.

A pump station with a frequency converter is a device including a pump, a pressure sensor, a frequency converter, a hydraulic accumulator, or a hydroblow protection. The pump is controlled by the PI, PD or PID control laws. The implementation of the continuous control law provides for a different intensity of the operation of the performing mechanism (pump), depending on the different deviation from the target value of the controlled value (pressure), which varies due to the different magnitude of the deflecting factor (flow rate). This can be realized using a frequency converter. Most devices of this class on the market have the range of settings that gives possibility to set the desired pressure level.

The advantages of such solutions are:

- ✓ low level of noise;
- ✓ stable pressure that doesn't depend on the consumption value;
- ✓ long lifetime due to smooth working modes;
- ✓ ready-made solution.

Among the drawbacks should be noted:

- ✗ high price;
- ✗ low maintainability.

From the discussion above it can be concluded that cheap pump stations with relay control can provide water supply, but its quality will not be the best, and for in a more expensive pump stations with frequency control can provide it at a high level. It should be noted that both systems can be assembled from separate components. In this case, they favorably have a wide range of possible characteristics and higher maintainability.

The essence of my work is to create a water supply system, which will have all the advantages of a pumping station with a frequency converter, but at the same time will cost not much more than a pumping station with a pressure switch. Such a combination can be achieved by assembling a system from separate ready-made components, and some of them can be self-made.

As a ready-made components the following can be used:

- ✓ pump;
- ✓ pressure sensor;

✓ hydraulic accumulator or protection against hydroblow.

The frequency converter and the control unit are subject to development.

The frequency converter converts the initial mains voltage 220 / 380V 50Hz into the voltage and frequency necessary to reach the set parameters at a specific time. The implementation can be based on a scalar or vector laws. Scalar law is applied for the systems which are undemanding to high precision, such as pumps, fans, etc. Unlike vector law, it is much less demanding to computational resources, has a simple implementation of control algorithms and a simpler circuit diagram.

It was decided to develop it using own resources because of the high cost of ready-made solutions, as well as the features of single-phase pump control. Because single-phase pumps have a wide range and an acceptable price.

The control unit will be built on the basis of the microcontroller STM32F103C8T6, which having a comparable price with its analogs has an order of magnitude better characteristics. It will be responsible for taking readings from the pressure sensor, issuing a control signal, outputting information to the control panel.

It should be noted that its computing power is sufficient to perform the functions of both the control unit and the frequency converter simultaneously.

We will highlight the additional advantages of this approach to solving the problem of water supply:

✓ the flexibility of the system;

✓ the possibility of replacing an individual component in case of its failure;

✓ the possibility of installing both surface pumps and submersible pumps;

✓ the possibility of further modernization and improvement, as well as the

addition of new functions if necessary.

This development in the case of its successful implementation will allow quite cheaply and, at the same time, effectively solve the problem of water supply to consumers, including domestic needs in private houses without a centralized water supply system.

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BASIC IMPLEMENTATION OF MOTION DETECTION

The security cameras have been used for a long time. In the course of their development they have gone a great path beginning from the gadgets which used a lot of memory, wasted time and were not ergonomic in general till highly technological modern equipment. On the market of surveillance devices they were replaced by the motion detection cameras. A motion detection camera is a camera that can be activated

by detecting motion, by turning on the flood light, starting the alarm or even recording. The detection can be done by measuring the speed or the vector of the objects in the field of view [1].

Raspberry Pi 2 (a small single-board computer), Raspberry Pi Camera Module v2 and Passive Infrared sensor (PIR) were used for the creation of the motion detection system. This computer is the main module for image capturing and processing. The camera plugs directly into Raspberry Pi and delivers 5 MP image resolution; 1080p, 720p, 480p video recording [2]. A highly effective, low-cost technology for detecting unauthorized activity by monitoring changes in infrared heat patterns in the area under observation. The PIR sensor detects the change in temperature and triggers when an unauthorized object enters the perimeter. It can turn an alarm or security recording on. The great advantage of the PIR detection systems is a small memory bank that receives the amount of infrared energy typically focused on its surface when there is no activity in the area [3].

Current system operates as follows: PIR sensor executes motion detection, camera executes image capture, and Raspberry Pi executes data processing. System analysis showed that PIR sensor has a number of disadvantages, such as necessity of special conditions for the arrangement, range of motion detection and probability of false alarms. So, it was decided to remove it from the system and to implement camera-based algorithm for recognition of alive objects.

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KEY TRENDS OF SMART HOME DEVELOPMENT

In today's world technology is advancing with a fast pace, radically changing our lives. A lot of companies which produce various household appliances and gadgets implement some kind of artificial intelligence technologies in them. Moreover, these devices can be linked into a single network. This enables them to "communicate" with each other and with the host, thus forming a system of "smart house".

Of course, such systems are a far cry from real smart homes from science fiction shows, where systems of artificial intelligence behave like a human, fully in charge of the house and are able to create Virtual Reality. But this is only the beginning.

There's no doubt that technology advances faster than we can even keep up these days, and the smart home sector is one of the fastest-growing. At CES 2018, hundreds of companies showed off a variety of new smart home solutions and gadgets, from the useful and innovative to the repetitive and uneventful. Here we offer an outline of key technologies in the sphere, which are believed to shape the nearest trends of "smart home" further development.

1. Voice assistants in everything.

Smart home tech allows you to automate your home, from lighting and security to entertainment and cooking. More and more of these devices are starting to get voice-activated upgrades baked right into the hardware. Last year, we saw countless devices and gadgets that work with voice assistants, but you needed a dedicated smart speaker to take advantage.

Now, one can basically skip the speaker entirely. But if your home has already got an Echo or a Google Home, having more devices that respond to person's voice commands could lead to over-saturation and frustration. The breadth of options to come in 2018 will definitely create more ways to build the perfect smart home, but it will also require smarter planning on the part of the consumer.

2. Smart home security suites that suit all needs.

There are numerous smart home security devices available on the market: motion sensors, security cameras, smart locks, video doorbells, etc. However, if you are buying different devices from different brands, syncing them all up can prove difficult, and juggling multiple apps is a hassle.

Various smart home companies are launching security solutions that make it easy to keep an eye on things from one access point whether you want to stick with a single brand or mix and match. What is really compelling about all of the new tech is that it can be customized to individual homes and preferences for a completely DIY experience rather than an out of the box solution that won't always fit every home.

This year, they will finally be releasing the Ring Alarm Security Kit (originally the Ring Protect) as well as motion sensors, night-lights, outdoor lighting, smoke and water leak detectors, and new wireless, standing smart cameras for a holistic way to keep an eye on your home all in one app.

GlobalLogic, a proven design company, has a wealth of experience in automating smart home projects for diverse customers from around the world, from startups to technological giants. Our practice proves that while mobile app interfaces are a great tool, it's easier and more natural for a user to communicate at home through voice.

3. Conversation with a device that has artificial intelligence, understands a person and performs respective commands, brings a completely unusual impression. According to a study by Gartner, by the end of 2018, 30% of our technology interaction will take place in a conversation format with smart machines. Leaders in technology products and services must now invest in improved voice interfaces, which are still

limited. The future comes in the form of a home personal assistant, and in the end, the language itself will become a versatile interface for home use.

An excellent example is Alexa from Amazon: Among other things, Alexa organizes the voice control with smart home appliances. Over the years of Siri's upgrade, Google Now and Cortana have also become technologically advanced personal assistants at the head of the smart home-ecosystems.

Voice-guided intellectual functions of the house develop gradually. So, Mark Zuckerberg created a system called Jarvis for his own home. The name of this device is similar to a computer with artificial intelligence belonging to Tony Stark in the movie "Iron Man": his name is J.A.R.V.I.S. stands for Just A Rather Very Intelligent System.

4. A wonderful time for progress ... But there are also difficulties.

Artificial intelligence is a key element of human interaction with a machine. However, the implementation of even simple functions, such as turning on and off the light, is a complicated task, since commands can be formulated very differently: "Turn off the lights in the bedroom" or "Keep the lamp in the baby".

Teaching home assistants to understand different linguistic senses is an important step towards positive user experience. Voice biometrics and intelligent decision-making will help you to come here. For the phrase "Play my favorite song," the home assistant must be able to distinguish the voice of a person and choose music according to their preferences.

To implement the potential of intelligent home systems, market leaders need to collaborate and form unexpected partnerships. This will ensure the emergence of high-quality new devices and services interconnected, which will make the life of the user even easier. Currently, the focus of the experts is the global benefits of smart homes, and for a long time such systems should move from the "bad mother" category to the "must have" category.

In the end, security and reliability are key parameters that should remain at the height of the evolution of technology for housing. For example, given the fact that the voice command can activate the security-related function, it is necessary to ensure the exact delimitation of a certain person's live voice and audio recordings in order not to hit the catchers. And soon we can all have Iron Man technology or a computer to manage our home, car, and home appliances.

Undoubtedly, artificial intelligence and systems of "smart house" are our future. And this is not only convenient, but it also preserves the planet's condition and saves our time.

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WIRELESS TECHNOLOGIES IN INDUSTRIAL NETWORKS

Wireless technology today is experiencing a real boom in development. This is mainly due to the strong entry into our lives of smartphones, tablets and mobile computers, which, among other things, can serve as universal control systems for managing automated control system, provided that there is constant access to the Internet, regardless of whether the terminal is moving or is in space. In addition, in various branches of industry, agriculture, military, there is a growing need for the organization of reliable systems for managing reliable objects and integrating them into a global network. Similar trends are observed all over the world and lead to the inevitable development of wireless communication technologies.

In this work, the equipment and software for the organization of the global networks and the networks which use telecommunication providers (GSM, GPRS, EDGE, 3G, WiMAX, etc.) are considered[1].

Types of wireless networks:

- Personal wireless networks.
- Wireless sensory networks.
- Small local wireless networks.
- Large local wireless networks[2].

Types of technologies which are used in industry:

Bluetooth I / O (IEEE 802.15.1). The main area of application of Bluetooth technology is the integration of components of automation systems into the local networks based on a field bus or on the network of industrial Ethernet. With the support of various profiles, the wireless standard can be used to address a wide range of tasks.

Distinctive features are as follows:

- Very reliable method of data transmission in production premises with metal objects.
- The possibility of local parallel operation of several Bluetooth networks.
- Automatic coexistence mechanisms provide the resistance to interference with the parallel work of WLAN 802.11b / g.
- Radio network connection up to seven terminal devices at one radionetwork.
- Bandwidth up to 1 Mbps.
- Range of transmission is usually more than 100 m in industrial premises and more than 200 m in open air conditions.
- Ideal for fast, cyclic transmission of small data packets.

- Transparent data transmission over Ethernet network at Layer-2 level, for example, in PROFINET IO systems.
- High data security by encoding 128-bit data and authenticating by Trusted Wireless Terminals.

Among the methods of reliable wireless transmission, it is worth noting the following:

Trusted Wireless is a technology for industrial radio communications to transmit the signals, noncritical to the process of delay, over long distances - up to several kilometers.

Wireless MUX is a simple solution for the transmission of digital and analog process and control signals - simply and reliably without cables, from one point to another. A reliable transmission at a distance of up to several hundred meters.

High-performance networks are represented by **WLAN** technology (IEEE 802.11). On the basis of WLAN it is possible to implement networks that combine many end devices. Because WLAN systems allow for easy integration into the information networks, they are great for mobile data management, monitoring and registration. In addition, it is possible to create a fast communication channel between controllers and to transmit real-time input and output data in PROFINET I / O systems.[3]

For example: use of wireless technologies on the basis of AFS(automated fare system) in the system of public transport of Zhytomyr:

- all transport terminals have a communication module, SIM card and are IoT devices;
- devices automatically upload transaction data and validation to the server over the radio channels;
- data transmission technology using 2G mobile communication for data transmission;
- configuration updates are also done using 2G directly from the terminal management system
- the convenience is that the exchange of data between the devices does not require the installation of additional cables and in fact terminals depend only on power supply and do not require additional telecommunication costs.

Conclusion:

A wireless network is not a solution of the type "installed and forgot". It is necessary to conduct a network audit on a regular basis; to interact with IT services at different stages of network construction, especially at early stages, and to involve these departments to diagnose network status.

By following these simple conditions, users can enjoy the flexibility and versatility inherent in the wireless solution, and in many cases the costs can be reduced.

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HARDWARE AND SOFTWARE COMPLEX FOR RESEARCHING CARDIOVASCULAR SYSTEM OF A HUMAN BEING

This work is devoted to the development of hardware and software complex for the analysis of the state of the human cardiovascular system. The heart is the most important organ of the cardiovascular system. The human organism cannot exist without it, because it is the contraction of the heart muscle that ensures reliable blood flow and all processes of vital functions in organs and tissues. That is why it is crucial to check the work of the heart from time to time, even in case if there are no visible complaints about the state of health in general.

The complex consists of seven main parts: a unit for measuring pulse oximetric data, a unit for measuring heartbeat (ECG), a pre-processing and data transmission unit, a mini-computer, a special software for data processing, a display for the output of cardiovascular system data, and an input block. The block diagram of the complex is shown in Figure 1.

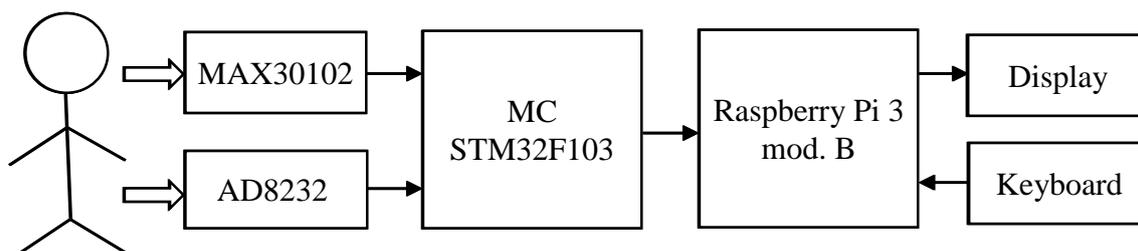


Figure 1 - Block diagram of hardware and software complex

The block for taking pulse oximetric data consists of a specialized module of Maxim Integrated called MAX30102. The MAX30102 is an integral sensor module designed to facilitate the development of portable medical devices for monitoring heart rhythm and blood oxygen saturation. Red and infra-red LEDs and a photodetector, as well as built-in optical elements, are integrated into this chip. Available in the MAX30102 electronic circuitry for signal processing is characterized by low noise level and provides suppression of external illumination. In the process of measurement, a channel of red and infrared light is used. The glow intensity and the duration of the measurement sessions are controlled by the software. The basis of the pulse oximetry method is measurement of the absorption by hemoglobin of red and infrared rays. Hemoglobin serves as a kind of filter, and the "color" of the filter depends on the percentage of oxygen in the blood. And the "thickness" of the filter is determined by the pulsation of the arteries, that occurs when the amount of blood in them changes. This unit is controlled by a ST Microelectronics STM32F103C 32-bit microcontroller. Communication and data exchange with the module occurs via the I2C data bus.

The Bioelectric Potential Registration Block (ECG) uses the specialized chip of the Analog Devices AD8232, which is an integrated signal processing unit for ECG and other biopotential tasks. The microcircuit is for reception, amplification and filtration of weak biopotential signals in the conditions of strong interference. The AD8232 has very decent features: low current consumption of 170 mA, Rail to Rail output, built-in HF noise filter, 2-pole high pass filter, 3-pole low pass filter, 80 dB low-noise ratio. After pre-amplification and filtering, the signal is transmitted to the ADC of the microcontroller.

The STM32F103C microcontroller is used to control the MAX30102 module and acts as a bridge between the computer and the blocks for data retrieval as well as for the preliminary processing of the received data. Built-in 12-bit ADC of the microcontroller is used to digitize the ECG data. The connection between the MK and the Raspberry Pi 3 microcomputer occurs through the Serial Interface SPI.

The Raspberry Pi 3 model B is one board mini PC with a 64-bit four-core Cortex A53-based CPU running at 1.2 GHz. The amount of RAM is 1 GB. The mini PC includes a decent peripheral set: 4 USB ports, HDMI port for connecting the monitor, Ethernet, 40-pin GPIO port with the ability to connect various data transmission interfaces (UART, SPI, 1-Wire, I2C, etc.). Importantly, the cost of this PC with such features is quite low (approximately \$ 30). This PC operates on the basis of the Linux operating system, which provides us with reliability, speed and free license for the use of any available distribution.

The software part is done using the cross-platform application Qt Creator. Qt Creator allows you to create a flexible graphical user interface, as well as further mathematical processing in C++ with the ability to use third-party libraries and classes. This toolkit allows you to use the generated software code on machines with different operating systems and architecture. The program will allow you to visually observe the indices of oxygen saturation, heart rate, ECG and other parameters. It is possible to save data to the PC's memory, print, and transfer to the server or to a doctor through the Internet.

In the course of this work, a complex for the study of the cardiovascular system of a person was designed. The structural and functional schemes were developed and the main element base was selected. This development is a successful combination of quality, the possibility of qualitative processing of bio-signals for a small cost of the complex components.

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ANALYZING UKRAINIAN PARLIAMENT NETWORK

In the era of global computerization, we generate a lot of data which could be used to improve human life. Recently Big Data has been used to analyze and influence the society. A vivid example of Big Data usage is Barack Obama's successful 2012 election campaign. Big data was used to analyze the electorate preferences and to correct the candidate's program. Big Data is widely used by US National Security Agency as well [1].

Nowadays more and more corporations and government institutions provide open access to their data. A star rating system has been developed for describing Open Data quality [2]. There are 5 stages in it:

- 1 stage (1 star): data is available on the web (whatever format) with an open license;
- 2 stage (2 stars): data is available as machine-readable structured data (e.g. excel instead of image scan of a table);
- 3 stage (3 stars): data is available in well-known formats (e.g. CSV, JSON, XML, YAML) and can be processed automatically;
- 4 stage (4 stars): data is stored according to open standards (e.g. W3C - RDF and SPARQL) to identify your data;
- 5 stage (5 stars): data is linked to the data from other sources.

In this paper we research 'Open Data Portal of Verkhovna Rada of Ukraine' based on Open Data. The goal of our research is to find hidden relations between deputies in Verkhovna Rada of Ukraine.

The network of the parliament is a graph with edges represented by deputies. To build links between graph edges the following principles are taken into account: authorship based links; voting based links with a threshold; and voting based links with different vote types – 'for', 'against' and 'abstained'.

Vote based links between deputies were researched:

- voting 'for' and 'against' for bills which were accepted and received 50-55% of the votes;

- identical votes between deputies. Some links were removed by a threshold;
- voting for the popular bills (bills which were selected from mass media);
- voting for bills by different headings:
 - Multilateral international agreements;
 - Security and defense;
 - Sectoral development;
 - Humanitarian policy;
 - Bilateral international agreements;
 - State construction;
 - Economic policy;
 - Organizational issues;
 - Legal policy;
 - Social policy;
 - Constituent powers;

Python library ‘igraph’ was used for modeling and construction of graphs. Network visualization and visual analysis were carried out with the use of ‘Gephi’ application.

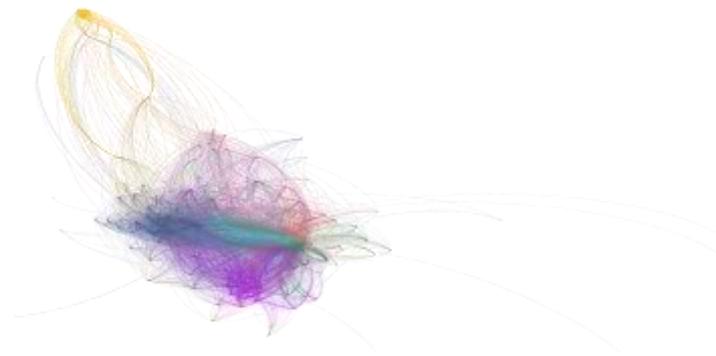


Fig. 1 Vote based links between deputies

In order to prove or declaim the idea of parliament division different from the official one (i.e. fractions, coalition and opposition), we tested the following hypothesis and received the results:

- authorship based links are impossible to check due to insufficient information (around 6%);
- ‘all types of vote based links between deputies show negative results, the graph structure is not divided;
- ‘For’ vote based links show negative results, the graph structure is not divided;
- voting based links with the use of threshold show parliament split into opposition and coalition with a 10% threshold. The Parliament splits into opposition and coalition with 20% threshold. Strong groups inside fractions are formed while using a 70% threshold.
- analysis of voting based links for bills under different headings revealed 3 different groups. The first group of headings shows the Parliament split into opposition and divided coalition. The second group shows the Parliament split into opposition and coalition. The third group of headings shows the same interest to the voting from different fractions in the parliament;

- voting based links for bills which have 50-55% of all votes ‘for’ demonstrate that fraction ‘People Front’ votes more organized to prevent the bill from being approved.
- analysis of popular bills discovered regularity conservation of Parliament division for data sets of smaller size;

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SIMULATION HYPOTHESIS

The purpose of this study is to investigate the evidence of the simulation hypothesis. On the basis of scientific experiments, several pieces of significant evidences of the virtuality of our world were obtained. Based on the theory of quantum entanglement and the fact of observation, there is a parallel between the already created human worlds (video games, simulations, etc.) and our world. It is investigated that the difference between them as well as the reasons for how this difference becoming less and less during the technological progress. It has been found out how people can eliminate simulation and what possible consequences can occur. It is determined how this hypothesis can enable people to bypass the Fermi paradox that states that every intelligent civilization will be self-destructed or destroyed by other factors, such as black holes, or ultrahigh tectonic activity, etc.

The hypothesis forecasts the possible spheres of human life that are highly likely to be affected as well as it suggests some useful recommendations for people. Based on these studies and significant chances of this hypothesis of being true, some advantages and disadvantages have been found. The information about both the followers and the opponents of this hypothesis and the history of its creation was processed. The answer to the main question “what will change if this hypothesis becomes the official conception of our world creating” has been found.

It has become clear why it is necessary to promote this hypothesis to the masses and what this will give us. During the study of the topic it was suggested to spread the popularity of this hypothesis in films, games, books and the rest of the mass culture issues. The influence on the further distribution and development of the simulation

hypothesis in the past and present was investigated. The opinions of the experts on how and when people can simulate the world were analyzed.

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DEVELOPMENT OF A BROADBAND SHORT-WAVE RADIO COMMUNICATION DEVICE

Modern conditions of functioning of radio-electronic communication complexes put increased demands on their work. Quantitative and qualitative changes in the electronic warfare means are growing. As a result electronic warfare means become more effective than radio-electronic communication means. To improve the effectiveness of communication means it is necessary to increase their noise immunity and their work secretiveness.

The work suggests concealing communication device work by expanding the range using an LFM signal. It enables us to carry out the transfer of messages with the spectral density of signal lower than the noise level. In combination with the radio line work pulse mode it will allow us to create a communication system with a relatively high level of security.

A communication device consists of the codec and high-frequency modem. The language signal with the upper frequency of 4 kHz enters the input of a communication device. The analogue signal is sampled in the codec, where pulse-position modulation (PPM) is used. It changes the time position of the pulse. The encoder consists of the amplitude-time transformer, delay device and pulse generator. The decoder contains a time-amplitude transformer, pulse generator, a delay device, a trigger and a detector with low-frequency amplifier.

The encoder output signal enters the modem, which contains a radio pulse generator, a dispersion delay line and a high-frequency amplifier. The output signal is supplied to the antenna.

The signal is received by the communication device antenna. Then it arrives at the input of the demodulator high frequency amplifier and the dispersion delay line.

The latter performs the function of the coherent filter processing a LFM signal. A generated response impulse goes from the modem output and arrives at the input of the decoder time-amplitude transformer. The analogue signal coming into the communication device speaker is generated through the use of a detector with a low frequency amplifier. LFM radio pulses possess the property of compression in time when passing through a consistent filter, which makes them widely used in different systems.

The article presents the basic principles of digital generation and processing of LFM signal, the characteristics of software and hardware means and algorithms of implementation of signal generation and processing in the communication device.

Thus, the most acceptable way for the expansion of the signal spectrum in the range of short waves is to use a LFM signal. It will boost noise immunity and communication secretiveness. This transfer of information is not associated with a change in the transmitter frequency. The interception of information by existing devices that use frequency modulation, is virtually impossible. The use of modern digital methods for signal processing and generation (based on modern microprocessors) instead of dispersion delay lines will create a compact and cheap enough communication device.

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INTENSIFYING RESTAURANT BUSINESS MANAGEMENT BY THE USE OF AUTOMATION SYSTEM

In the modern world, due to the growing competition in the restaurant business leads to the necessity of finding new ways to improve this sphere. One of the solutions to the problem is the automation of restaurants.

Automation of a restaurant is a process of implementation of software and hardware complexes at the catering enterprise. The restaurant automation system is a multifunctional institution management system.

Advantages of using a complex of restaurants software automation are:

- the system allows you to always have access to current information about the restaurant;
- the restaurant automation system helps to eliminate labor-intensive accounting operations, plan banquets and corporate events, personalize work with clients, keep reservation tables;
- it is possible to have continuous monitoring of the work of all components of the restaurant, analyze and forecast the results of the institution.

The main tasks of the software complex for restaurant automation are:

- increased profitability and reduced restaurant costs;
- analysis and optimization of restaurant supplies;
- increase of labor productivity of the personnel;
- improvement of the customer service quality;
- creation of loyalty systems;
- analysis and planning of further business development.

Expected results of the automation system of the restaurant:

- optimization of restaurant supplies;
- optimization of accounting;
- reduction of personnel errors;
- optimization of conditions and quality of all performed works;
- increase in profit.

Automated creation of a relevant database (Image 1) is also important for catering. The database should be interconnected with waiters' terminals and cashier's bartender, office worker, accountant and kitchen ordering. It is necessary to analyze previous customer requests for ordering products and create menus for optimal restaurant inventory management.

The basis of the automation system of the restaurant is the mechanism of reporting. Reports help control restaurant supplies and costs, collect marketing information.

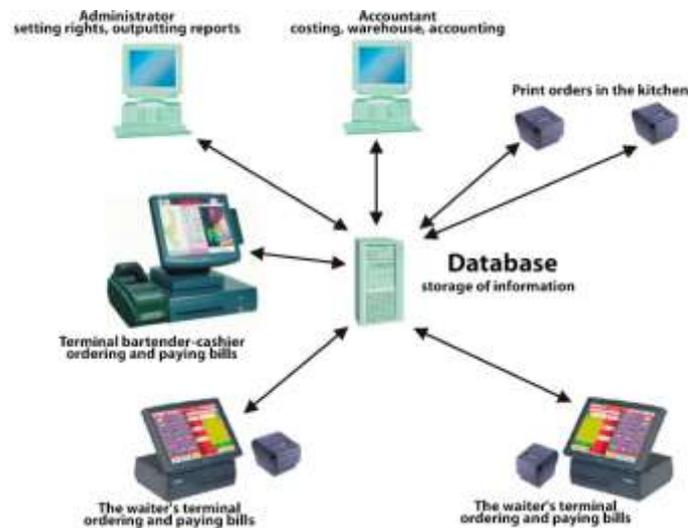


Image 1. Database Dependencies

The result and the main advantage of the creation of the restaurant automation system is reducing the redundancy of stored data, increasing the reliability and increasing the speed of information processing. The system organizes orders for customers of the restaurant, ordering and consuming products, etc. By automating these processes, all information will be stored in the same database, where data is recorded using a convenient interface.

So, for the restaurant staff and business owners, the automation system provides many opportunities that facilitate the workflow, change and simplify the work. The automation system greatly enhances the management of restaurant business.

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BLOCKCHAIN: PRINCIPLES OF WORK AND PERSPECTIVES OF APPLICATION

*“Online identity and reputation will be decentralized.
We will own the data that belongs to us.”*

*W. Mougayar, author The Business Blockchain:
Promise, Practice, and Application
of the Next Internet Technology (2016)*

Blockchain is known as distributed ledger technology. It's like a distributed database, that millions of computers (often called nodes) around the world have access to and are constantly updating [2]. Distributed ledgers, the term of art for blockchain's underlying technology, offer an exciting new way to transact business without a central authority.

The first work on a cryptographically secured chain of blocks was described in 1991 by Stuart Haber and W. Scott Stornetta. The first blockchain was conceptualized by a person (or group of people) known as Satoshi Nakamoto in 2008 [2; 4]. It was implemented the following year by Nakamoto as a core component of the cryptocurrency bitcoin, where it serves as the public ledger for all transactions on the network. Through the use of a blockchain, bitcoin became the first digital currency to solve the double spending (a potential flaw in a digital cash scheme in which the same single digital token can be spent more than once) problem without requiring a trusted authority and has been the inspiration for many additional applications. The words *block* and *chain* were used separately in Satoshi Nakamoto's original paper, but were eventually popularized as a single word, *blockchain*, by 2016.

According to the fundamental principles of work in this technology any data put into the blockchain must be verified. Transactions are grouped together in blocks (hence the name blockchain), then verified by the computers (nodes) in the network. When a computer joins the network as a node, they receive a copy of the blockchain which acts as proof of all the transactions that have been performed.

This means that all data stored on the network is transparent; it is public by default. This also means that all the data in the blockchain network cannot be corrupted or deleted. However, this doesn't mean you can see who is doing the transaction. For instance, with bitcoin, the public can see that someone is sending an amount to someone else but there is no information linking the transaction to anyone. This is because the public keys linking the transaction are kept anonymous. As well, it is considered to be un-hackable because it doesn't have a centralized system. Instead, it is hosted by millions of nodes around the world, instead of being in one central place [2].

Blockchain is important due to the very open nature of it: any computer can be a part of the network, all data has to be verified, and also the fact that it is difficult to hack, companies and institutions see potential in using this technology. It's almost a second version of the internet. In a report about blockchain, the UK government said that distributed ledger technologies, like blockchain have the potential to: "help governments to collect taxes, deliver benefits, issue passports, record land registries, assure the supply chain of goods and services and generally ensure the integrity of government records and services"

For this days we already have examples of how blockchain is changing our world. Here is a list of some companies and startups in various spheres of our life [1]:

Cybersecurity. "Guardtime" is a company that creates "keyless" signature systems using blockchain which is currently used to secure the health records of one million Estonian citizens. "REMME" is a decentralized authentication system which aims to replace logins and passwords with SSL certificates stored on a blockchain.

Healthcare. "Gem" startup is working with the Centre for Disease Control to put disease outbreak data onto a blockchain which it says will increase the effectiveness of disaster relief and response.

Financial services. Bank Hapoalim is a cooperation project between the Israeli bank and Microsoft to create a blockchain system for managing bank guarantees, which is a revolution in the management of money and assets over the Internet, and is expected to play a central role in the smart economy of the coming decades [3].

Government. Dubai has set sights on becoming the world's first blockchain-powered state. In 2016 representatives of 30 government departments formed a committee dedicated to investigating opportunities across health records, shipping, business registration and preventing the spread of conflict diamonds. The same is happening in Estonia where the country's government has partnered with "Ericsson" on an initiative involving creating a new data center to move public records onto the blockchain.

To sum it up, the technology of blockchain is here to change our world again making decentralized networks the next huge wave in technology. It has already started integration in various sectors of our life. A lot of countries are considering how they can use it for improvement of human life, and I this is only the beginning.

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INTERNET OF THINGS: OVERVIEW, ADVANTAGES AND DISADVANTAGES, CURRENT TRENDS

Internet of Things is one of the most modern trends in IT. Institute for Housing and Urban Development Studies predicts that there will be approximately 70 billion IoT devices in existence by the end of 2025 [1].

But what is Internet of Things itself? The Internet of Things (IoT) is the network of physical devices, vehicles, home appliances and other items embedded with electronics, software, sensors, actuators, and connectivity, which enables these objects to connect and exchange data. Each thing is uniquely identifiable through its embedded computing system but is able to inter-operate within the existing Internet infrastructure [2].

The first smart device (the first Internet-connected appliance) was a modified Coke machine at Carnegie Mellon University. It was able to report its inventory, and whether newly loaded drinks were cold.

The concept of Internet of things became popular in 1999, through the Auto-ID Center at MIT and related market-analysis publications. Radio-frequency identification (RFID) was seen by Kevin Ashton (one of the founders of the original Auto-ID Center) as a prerequisite for the Internet of things at that point. Ashton prefers the phrase "Internet for things." If all objects and people in daily life were equipped with identifiers, computers could manage and store them. Besides using RFID, the tagging of things may be achieved through such technologies as near field communication, barcodes, QR codes and digital watermarking.

Since then, the idea of smart devices spread out so much that it covered a wide range of applications such as healthcare, utilities, finances, traffic, etc. A lot of big companies are taking part in the development and improvement of IoT. There are the biggest of them: Amazon, ARM, AT&T, Ayla, Bosch, Cisco, Dell, Fujitsu, GE, Google, Hitachi, Huawei, IBM, Intel, Microsoft, Particle, Qualcomm, Samsung, SAP, Siemens [3].

It is obvious that this technology would not be so popular if it didn't give any advantages in the fields where it is implemented.

The major advantage of the IoT is the possibility to integrate the system into the surrounding environment where it can adjust and perform work based on aggregated data, making day-to-day life more convenient, easier and more productive. IoT devices can be compact, ergonomic and may not differ from regular social life objects.

The IoT can be used in medicine performing a continuous medicine check, in everyday life – developing the smart house paradigm, wide application in all kinds of industries, utilities, logistics, education, entertainment sectors, etc. [4].

Undoubtedly, the IoT world of future can be exciting and carefree, although at the moment this technology is too young and requires huge investment of funds to realize the conceived potential. One of the most salient weaknesses of the IoT is its implementation and upkeep costs.

There are many different manufacturers of the smart things already exists and they support only their own products, creating certain limitation of choice for the potential customer and the need to use individual applications for IoT devices administration.

Bret Greenstein, VP of IBM's Watson IoT Consumer Business, who highlights four key IoT trends.

Interestingly three of those trends were around convergence with other distinct yet highly correlated technologies. This underlines the principle that data is the fundamental ingredient of digital transformation. The technologies predicted to make big waves in the coming year – including IoT, artificial intelligence, blockchain and edge – are all methods of collecting, analyzing and storing information.

AI will make the IoT smarter and more productive to work with. According to Greenstein, however, 2018 is the year that understanding of its role as the brain running IoT systems will spread. As more and more devices become connected and capable of speaking to each other, AI – deep learning, natural language processing, image recognition and neural-network driven decision-making – will help them to understand each other, and us.

More CPU power will be spent at the edge. Pushing processing power to the “edge” – the front-facing elements of the IoT such as cameras and sensors which traditionally passively collect data to be processed in the cloud – brings a number of benefits and opportunities. Movement towards greater exploitation of this technology is a key trend for 2018 too, says Greenstein.

Blockchain adds immutability and integrity to IoT transactions. Blockchain and the IoT in many ways seem built for each other. Blockchain – a distributed and encrypted digital ledger – is well suited for recording details of the millions of transactions which take place between IoT machines. It's only recently that the idea of convergence between these technologies has been widely talked about, though. Greenstein tells me that though the partnerships are not yet public IBM is working in “multiple industries” with clients on bringing them together and hinted that more details are very likely to emerge in 2018. “What people missed about blockchain, because they were so focused on the financial side of things, which is the obvious use case,” he tells me, “is that all of this IoT data, particularly in supply chains or where

things move between owners, requires all of that data to be stored in some kind of unchangeable record.”

Massive growth of IoT in manufacturing and industries is being expected in the nearest future. Augmentation is the keyword here – and the vision here is that smart, connected tech will continue to help humans in skilled and manual tasks. This will be done by giving them access to context-sensitive insights that answer specific questions about specific things at the right point in time [5].

As a conclusion we can obviously state that IoT is a technology of a future. Of course, there are a lot of things to study and to research, and a lot of work to do. It is undeniable that this technology will make our life easier and bring much value in different fields.

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STUDY OF IDENTIFICATION METHODS FOR ACCESS OF VEHICLES TO CLOSED OBJECTS

The tension of the situation in the east of our country and in the world in general requires the discovery of new information technologies for protection and defence of objects from unauthorized access. Particularly urgent is the need to protect critical infrastructure objects.

The protection of territories perimeter is impossible without the use of computerized control systems and automation. However, with the development of information technologies, the equipment of malefactors, who are finding new ways to overcome obstacles in their path, is increasing. Therefore, it is important to improve the computerized access systems on the closed objects in order to increase their stability and reliability of functioning.

It is impossible to achieve the appropriate level of perimeter protection of closed objects without using a combination of methods of vehicle and person identification, integrated into the computerized access control systems to an object.

As a result of the research it was discovered that it is necessary to use multifactorial identification of both vehicles and persons in modern computerized object access systems for protection against counterfeiting. However, the presence of a large number of identification methods requires a thorough analysis and selection for cumulative use by integrating into a single computerized access control system for a closed object.

The aim of the study is to increase the level of protection of perimeter of the closed objects from unauthorized access. The main task is to research and optimize the methods for identifying vehicles for integration into computerized access control systems for an object.

Access control system (ACS) is a complex of combined electronic, mechanical, electrical, hardware-software and other means, which provide the access of certain persons to separate zones or to certain equipment, technical means and objects. And that restricts access to people who do not have this right.

The protection of any object includes several boundaries, the number of which depends on the level of the mode of the object. An access control system (ACS) will be an important milestone in all cases.

Well organized and with the use of modern technical means, ACS will solve a number of tasks. Among the most important are the following: counteracting against industrial espionage, theft, sabotage, intentional damage to property; accounting of working time; control of timeliness of arrival and departure of employees; protection of information confidentiality; regulating the flow of visitors; control of entry and exit of transport.

The most commonly used ACSs include the following: ordinary and wall turnstiles; turnstiles for passage in corridors; cabins; automatic shutters; rotary turnstiles; rotary doors; road blockers; barriers; parking systems; round sliding doors; three-stroke turnstiles; full-height turnstiles; sliding turnstiles.

In our case, the identification of vehicles for access to a closed object is considered. For the entry /exit of transport, checkpoints are organized. The transport checkpoint includes an observation deck and offices.

Checkpoints for motor vehicles passing are equipped with:

- sliding gates and barriers with mechanical, electromechanical and hydraulic actuators, as well as devices for emergency stopping of the gate and opening them manually;
- control sites with platforms for car inspection;
- traffic lights, warning signs and light-emitting diode such as "Beware of traffic";

– telephone and alarm communication and lighting for the inspection of transport. [1]

Access control system (ACS) is the oldest component of the security system. At the moment, there are many varieties of ACSs from different manufacturers, as well as its components.

Despite the uniqueness of each particular access control system, it contains 4 main elements: user ID (card-pass, key), identification device, microcontroller and actuators. The general scheme of ACS is shown in Fig. 1



Figure 1. The general scheme of ACS

The work of the access control system can be described as follows. Each employee or regular visitor of an organization receives an identifier (electronic key) - a plastic card or ibutton tablet with the individual code. Electronic keys are issued as a result of registration of the listed persons by the means of the system. Passport data, photos (video images) and other information about the owner of the electronic key are recorded in the personal electronic card. The personal electronic card of the owner and the code of his electronic key are connected with each other and entered in specially organized computer databases. [2]

So, let's turn to the analysis of the vehicle identification methods, namely, to the analysis of the method and technology of identification of vehicles by their license plate.

Currently, there are not so many systems for identifying license plates, few of which are truly high-quality products. However, simultaneously with writing of algorithms, hardware is being developed for these purposes. Systems with high speed and accuracy of recognition are usually very expensive. The high cost of existing products does not allow for their mass implementation.

The task of identifying a car can be divided into two parts: localization the plate number and character recognition.

The license plate recognition algorithm consists of the following steps:

1. Beginning.
2. Incoming image.
3. Recording in the processing conveyor.
4. Equalization (alignment of the histogram).
5. Filtering.
6. Search for lines.
7. Binariation.
8. Screening of redundancy.
9. Search for an area of interest.
10. Search of numbers and letters (9 characters with letters).
11. Comparison with the image (correlation).
12. Output of license plate values.
13. Output of the recognized image.
14. End.

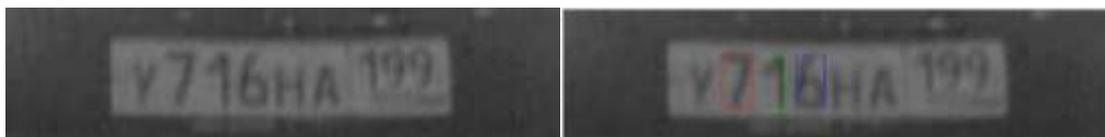


Figure 2. Examples of algorithms for normalization and character segmentation

These digits are generated in advance. Next we choose the best coincidence, and if it is more than a certain threshold, we accept it as a good result.

Areas are moved from left to right, so that the required digits will come in the right order. In this case, the simplest algorithm for outputting digits by parameters is the comparison with the template. There are several options, each one has its own pros and cons. This method, which is implemented, is quite simple and has acceptable reliability and stability.

Consequently, methods of vehicle identification for integration into computerized access control systems for an object were investigated. For the organization of entry/exit of transport on the closed object, checkpoints are created. The transport checkpoint includes an observation deck and offices. In turn, at the checkpoint, the access system is integrated into the ACS. One of the components of ACS is the vehicle identification system. To develop an efficient camera image processing system, it is necessary to have the appropriate software that allows to carry out, correctly and efficiently, the operations of the vehicles movement control, intended for the entry / exit of automotive equipment. It is suggested to use the simplest algorithm for identifying the number of digits according to the parameters - comparison with the template.

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UDC 004.6

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THE USE OF "BLOCKCHAIN" TECHNOLOGY IN E-LEARNING

Nowadays the Blockchain popularity is rapidly growing. There are a couple of effective solutions based on "Blockchain" already today, such as "Bitcoin" which is an

innovative payment network and cryptocurrency. Another example is a "Brave" browser that allows everyone to pay for sites and content anonymously, etc.

Basically, "Blockchain" is a distributed database. Everyone can securely access it and execute a transactional code. All transactions are stored in blocks of data. These blocks are created in such a way, that it becomes very difficult to manipulate them after they are added to "Blockchain". In order to add a block to "Blockchain" it is necessary to verify this block and after that it can be added. This procedure is called "mining". It is very ineffective to try to cheat a system, a giant amount of resources and computed power is needed for that, because the whole network is responsible for transactions verification and adding them to "Blockchain". So "Blockchain" can solve a security, high availability and transactions speed problem.

The architecture of "Blockchain" makes it a very powerful tool for usage in cryptocurrencies, building chronologies, certifications, safe information transferring, virtual products and many solutions in "Internet of things" field, for example your washing machine can safely order a washing powder, when it is needed.

One of the potentially interesting fields of "Blockchain" usage could be an E-Learning. A blockchain-based distributed, highly available learning management system can be a good example.

Such a system can have a blockchain-based certification method for students who completed the courses successfully. This way the network is responsible for the authenticity of course results, transactions in this case are results of course completion.

In addition, the encouragement mechanism to actively pass courses, to share knowledge, to write feedbacks, to share the content and other encouragement mechanisms for students can be implemented in this system based on "Blockchain". On the other hand a similar mechanism can be implemented to encourage course authors to publish their courses, to share knowledge and to improve their learning resources. To achieve that, an internal currency can be created and used. This currency will be payed to miners for the course results verification, to authors for content sharing, to learners for feedbacks, successful completion of a course and other things.

Everyone will be able to buy some resources like courses, certificates, learning content inside the system using internal currency. It allows network participants to have a reward for an active participation in a learning system improvement.

Besides, everyone will be able to buy an internal currency for real money and, probably, sell his/her own internal currency for real money. It will make system more flexible.

One more potentially effective way of using internal cryptocurrency is paying it for posting and watching advertisement inside the learning content. It allows to make resources cheaper, and get additional bonuses for network participants.

Internal cryptocurrency can be widely used inside a system for a safe money transferring from course learners to course authors, without any third parties, commissions, and it can be done really fast.

The "Blockchain" technology is a new page in architecture of highly reliable and highly available distributed systems and databases. It perfectly solves complicated accessibility, reliability and speed problems. A couple of effective solutions in different

fields based on "Blockchains" have been already shown to the world. This technology can be effectively used in E-Learning, it allows to implement innovative methods in modernization of learning management systems field, it can solve motivation problems in a new way, more effectively.

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TENSOSENSORS AS A MEANS OF ROBOT SENSIBILITY

The creation of physical equivalents of human sense organs is one of the most difficult problems facing the specialists in robotics and automation of production processes.

The created sensors and systems reacting to external influences can turn industrial robots, which while acting purely mechanically, into machines that have the ability to adapt, able to independently respond to environmental changes and make simple decisions.

The need to use operational information often appears when the robot is dealing with objects that are not oriented in space in various sizes and shapes, with fragile articles that can not be strongly compressed, but can not be dropped, and also need to be moved from place to place and so on.

In order to perform this function robots need a tens sensor systems. They are sensory devices that provide the measurement of the components of the force vector and the moment vector of the forces developed by the robot in the process of interacting with the product in the projection onto a certain coordinate system. Such systems are built on the basis of tens sensors.

The principle of the tens sensors is very simple; it is based on the dependence of the electrical resistance of a metal wire on its length and cross-sectional area. It is such that when the wire is stretched, its resistance increases, since the length increases and the cross section decreases. A tens sensor is a very thin wire, repeatedly bent to increase the length, or a thin foil, which are glued to the surface of the test piece or to the elastic plate of the torque sensor. When the part (plate) is bent, the length of the

wire (foil) increases, which leads to an increase in the resistance in the electrical circuit into which the tens sensor is connected. Modern electronic technology allows recording the slightest changes in electrical voltage and current caused by a change in resistance, and, accordingly, changes in deformation of the tens sensor.

One of the most common tasks for robots in production is the articulation of parts. When a robot needs to connect two bodies or insert one into another, for example: a cylinder into a circular hole, even if there is a gap between them, and therefore a problem appears, since there is always an error in the relative positioning and orientation of the mating parts, due to for example the angular skew, or the movement of the cylinder from the mouth of the hole into the interior is difficult, or the parts generally become wedged, as is usually the case with automated assembly, with the help of a non-sensed robot.

If the positioning errors of the parts prove to be more than admissible, the adaptive robot of the stress-strain sensing system knows the direction of the action of the forces arising from the contact of the mating bodies, knows in which direction it is necessary to move its gripping device with the part clamped in it, so that the reaction forces becomes zero or not exceed a predetermined value.

Basically, tens sensors are used for this purpose. They are installed between the last link of the robot and the gripping device or tool, in order to control the direction of movement of the manipulator arm; or on fingers, in the place of direct contact with the detail, in order to control the capture of the object and its strength.

The robot with a tens sensor system leads the cylinder exactly to the mouth, then, after determining the direction of the center of the hole after contact with the reaction forces, begins to move the cylinder toward it, not tearing the contact, gradually leveling and inserting it inward until the assembly is absolutely completed. The ability of a sensitized robot to determine the direction to the center after the contact of the cylinder with the usually wider inlet part of the hole makes it possible to almost 10 times reduce the requirements for the positioning error and the orientation of the assembled parts.

The tens sensors used for such tasks must have a high sensitivity to deformation, therefore, the best option is thin-film or foil strain gauges. Such sensors have a lattice of rectangular cross section with a very large ratio of width to height. And due to the large ratio of the perimeter of the section of the flat strip to the area of cross section, the susceptibility to deformation and the accuracy of its measurement improve. Due to the increased cross-section of the ends of the foil and foil grilles, the reliability of soldering (or welding) of the sensor leads increases. Also, due to the large contact area of the conductive strips of the sensor with the component, good heat transfer conditions are ensured.

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UDC 612.914

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ANALYZING EFFECTIVENESS OF IT PROJECTS DEVELOPMENT ACCORDING TO THE METRICS OF TESTING

Analyzing existing approaches to studying IT projects based on metrics of testing, one can conclude that none of them covers all stages of the innovation process. That is, it does not take into account all the factors that influence decision making on the completion of the project testing. The IT project analysis model should provide the user with predicted and planned values for the project development and testing performance. It is also advisable to take into account the influence of the environment, in particular, the competitiveness of the innovative product, diffusion processes and the state of the market for innovative products.

The topicality of the research lies in the fact that making decision to complete the project testing is based on the data obtained from the testing metrics.

Metrics is a quantitative scale and a method that can be used for measuring [1]. The introduction and use of metrics is necessary to improve the control over the development of the process, and in particular the testing process (Fig.1).

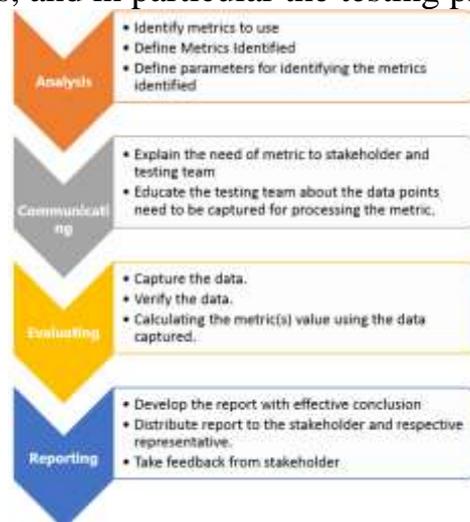


Fig.1. The scheme of the generalized model for analysing decision-making about the effectiveness of testing an IT project

The purpose of testing control is to obtain feedback and visualize the testing process. The information required for monitoring is collected (both manually and automatically) and used to assess the status and decision making, such as coverage (e.g. requirements coverage or test codes), or exit criteria (e.g. test completion criteria). Metrics can also be used to measure the progress of planned work and budget development.

There are 5 different groups of metrics [2]:

- Group 1 - Requirements for the software being developed.

This group of metrics will allow us to assess how far we have worked on the user story, to identify vulnerabilities and the most complex, potentially problematic features of the software, to understand where special control is required.

- Group 2 - The quality of the product being developed.

This group of metrics demonstrates the quality of the software, as well as the quality of the development itself.

- Group 3 - Opportunities and effectiveness of the QA team.

The main task of this group of metrics is to express in figures what the testing team is capable of. These indicators can be calculated and compared on a regular basis, analyzing trends, observing them, how various changes affect the work of the team.

- Group 4 - The quality of the testing team's work.

The task of this set of metrics is to assess how well the testers perform their tasks, determine the level of competencies and maturity of the QA team. With such a set of indicators, you can compare the team with itself at different time or with other, external test groups.

- Group 5 - Feedback and user satisfaction.

A group of metrics that shows how the product was accepted by end users, how much it met their expectations. But not only feedback about software is important: another important task of this group of metrics is to show whether users are satisfied with the process of interaction with the IT team in general and QA in particular.

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ARTIFICIAL INTELLIGENCE: WHAT'S NEXT?

Technology is always changing. And the rate at which it changes is always speeding up. Because of this exponential change, we can barely imagine what will happen next. But many scientists believe that soon computers will achieve artificial intelligence or AI. Computers can already solve difficult problems and complete complex processes - like driving a car or playing the game of chess. But intelligence includes much more than this. Intelligent beings know they are alive, they understand emotion and they are able to be creative. Many scientists believe computers will achieve this level of intelligence and more!

Considering the above, the **aim** of this article is to analyze the notion of Artificial Intelligence from the point of view of its benefits and threats.

Scientists believe that the intelligence of computers will soon become even greater than the intelligence of humans. No one knows when or how it will happen. But some of those who study the future of technology call this possible event – ‘The Singularity.’ A key part of achieving ‘The Singularity’ is the ability to create! Scientists believe that after singularity, computers will begin to design other new and more complex computers.

Many people question if this could ever happen. But Stephen Hawking, internationally famous scientist said: "Very complex chemical molecules operate in humans to make them intelligent. So it seems to me that equally complex electronic processes can also make computers act in an intelligent way. And if they are intelligent, they may be able to design computers that have even greater complexity and intelligence." [1, c.208]

Some of the scientists call this process the "Intelligence Explosion." They believe AI computers will design more complex computers - at an increasing rate of speed. Many universities and scientists are studying this possibility. Organizations such as Oxford University's Future of Humanity Institute are trying to prepare humans for it. Scientists do not know what an intelligence explosion could look like. But many of them agree that the future of the human race will change - in ways we do not yet understand. [2]

At a scientific conference in 2006, scientist, Eli Yudkowsky, spoke about the huge effect of this change. He said: "Over and over again, intelligence has achieved things that once seemed impossible and even strange. And we are not talking about a jump like the one from hunting and gathering to the Internet. The intelligence explosion would be a much bigger jump. It could and probably will re-shape the whole world." [3]

Researchers believe this future change will be positive. They say that computers will be able to solve problems that humans have never been able to solve - like poverty

and disease. Many suppose that humans will combine their bodies with computers to achieve greater abilities or longer life. Some even believe that people could defeat death by putting their brain and genetic information into a computer.

The other scientists are concerned about the negative effects of the “Intelligence Explosion.” They worry about the danger of computer designed weapons. Computer expert and scientist Bill Joy wrote a story for Wired magazine about AI. In it, he explained that many nations already have weapons of mass destruction that can kill large groups of people. But he believes it will be even more dangerous after the “Intelligence Explosion.” He wrote: "I think it is fair to say that we are on the edge of perfecting extreme evil. This evil could spread past the possibilities of weapons of mass destruction." [4]

Other scientists think that it is not computer-designed weapons that are the main danger. They think the danger is the computers themselves. Many films in popular culture present this idea. They tell stories in which computers take over the world and destroy human life. This is an idea that many scientists take seriously. Daniel Dewey studies at Oxford University's Future of Humanity Institute. He told Motherboard, an online magazine: "Artificial intelligence could lead to the end of humanity, the continuous unequal treatment of humans, or other risks... If we understand the risks better, we can make better decisions to avoid them or decrease the damage." [5]

Many of them argue on what the future of AI could look like. But some agree that AI is quite possible. They believe computers can achieve human intelligence because as they stress, humans are completely physical beings. Hawking supposed that human brains and computers work in basically the same way. But can this be true? Are humans just the total of their molecular parts? And is brain power the only thing that defines human nature? John Searle would say no!

Searle is a professor of Philosophy at the University of California, Berkley. He often argues with scientists about artificial intelligence. Searle assures that computers can never achieve human consciousness. He states that humans know they are alive in a way that computers will never be able to. Scientists may create computers with programs that model consciousness. But Searle does not think this is the same thing as true consciousness [6].

Many people would agree with Searle. They argue that there is something more to humans that cannot be re-produced. Many philosophies and religions teach that humans are both physical and spiritual beings. And it is this spiritual component that many people believe computers will never achieve, because of the Christian story of creation: "Then God formed a person from the dust of the ground. He breathed into him the breath of life, so that he became a living being."

So, as we can conclude from the studied sources, the notion of Artificial Intelligence is quite disputable, but nevertheless it is already on its way to change the world. And now it is only the humanity that is to ensure its responsible promotion.

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SMART TECHNOLOGIES

Technologies are no longer only functional devices of everyday life they have evolved into integral tools of future changes and new experience. Recent advances in the field of technology have led to the emergence of innovative technological smart solutions providing unprecedented opportunities for application in all spheres of our life. Scientists try to explore their potential not only to optimize existing processes but also facilitate the creation of more meaningful and personalized services and experiences.

All people agree that technology is only getting smarter, but most don't realize just how smart. Educational robots, intelligent implants, brain chips are no longer parts of a science fiction show. In reality, smart technology is around us every day. From surveillance cameras to clothing, today's smart technology is watching us, helping us, and getting smarter because of us.

Here are some examples of the most impressive smart technologies, which have already become indispensable parts of our life:

- **Smart Clothing.** As progress in science and engineering research advances, the gap between designers and scientists narrows and the area of smart clothing is likely to keep on expanding for the foreseeable future. Fabrics that enable digital components (including small computers), and electronics to be embedded in them to create fashionable, functional, comfortable solutions to meet everyday needs; whether it's in sports & fitness, outdoor & leisure, home care & health care. Leading companies in this sphere are AiQ, CrunchWear.

- **Smart Pills.** Health care systems across the world are facing massive challenges too. However, smart technology including wearable devices and patient monitoring systems can help to build a society in which everyone can live in good health, safety and security [3]. A revolutionary ingestible capsule that measures pressure, pH and temperature as it travels through the gastrointestinal tract to assess GI motility.

- **Smart Bionic Limbs.** Bionic limbs with machine intelligence that can sense their environment and predict a user's intentions. Smart robotics will enhance the powers of the able-bodied, too.

- **Smart Earbuds.** They feature a built-in optical sensor that monitors your heart rate without straps, wires, or batteries. It measures changes in blood flow through the capillaries for accurate heart rate detections.

- **Smart Glasses.** A wearable computer that adds information to what the wearer sees. Smart glasses devices have all the features of a smartphone with a wide range of healthcare and industrial applications.

- **Smart Refrigerator.** A refrigerator which has been programmed to sense what kinds of products are being stored inside it and keep a track of the stock through barcode or RFID scanning. It is equipped to determine itself whenever a food item needs to be replenished.

- **Smart Watches.** A computerized wristwatch with functionality that is enhanced beyond timekeeping. Modern ones run a mobile operating system and function as portable media players, offering playback of FM radio, audio, and video files to the user via a Bluetooth headset.

- **Smart Vehicles.** Driverless robotic vehicles that could someday communicate with each other to reduce traffic accidents. The current autonomous vehicles sense their surroundings with such techniques as radar, GPS, and computer vision [1].

These gadgets are just a few of the many amazing products on the market right now. The greatest thing about technology is that it's always improving through innovation and creativity.

But there are always concerns how far we can trust such systems. Performance failure is raised as frequent fear whenever smart technology is involved, especially when we are looking at self-driving vehicles and other sectors where human life could be directly affected by smart machines. New technologies mean new opportunities for attacks. Information in smart TVs could be the hacker's next source of personally identifiable information. New gaming consoles can inspire cybercriminals to create threats focused on gamers and gaming services. Self-driving cars may be hacked into and tampered, which could endanger passengers. People are afraid of losing their jobs or even intelligence with time.

In my opinion it is important to be aware of these threats, but remember that once there were similar fears heading into the industrial revolution. The main focus is for smart machines to enable us to be more productive and flexible. By using them we can make more efficient, sustainable use of our resources. We must be ready for smart technology to become a much bigger part of your life. It offers unbounded potential to

improve our lives and enhance sustainability from all spheres - home, health, manufacturing, work, transport, energy and leisure. But we also need to address issues such as IT security, skills and labour market problems.

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HEAD SDART¹ FOR BEGINNING MOBILE DEVELOPERS

Mobile development is a very promising direction in programming. People use smartphones for different ordinary affairs. And somebody is even really addicted to their pocket gadgets. That is why most IT solutions should be primarily targeted to be mobile friendly.

What is the language you love coding on? Java? C-Sharp? Maybe Python? Dart is about a mix of C# code style, Java's streams and embedded big arithmetic. Object oriented language with great flexibility that is enriched with powerful frameworks is the one worth trying. You have an opportunity to write client code using AngularDart (it is still processed into JavaScript to be executed by modern browsers), server code on DartVM or mobile one using Flutter [1].

We have been developing an absolutely new app using Flutter. It is a relatively new cross-platform framework developed by Google as a response to React Native [2]. Its Beta version has been released recently. That means it is still being developed further and it will be enriched with other features.

There are a lot of pros of native mobile development on Dart. One major advantage is that you have a single code base for different platforms. For now, Flutter supports building apps for only 2 major mobile OS: Android and IOS. However, these two cover almost 95% of world's mobile users [3]. Another great feature is possibility to write platform specific code that can interact with your Dart one. Apart from that, Dart has a bunch of "out of box" functional solutions. There are many libraries distributed w

¹ Head sDart stands for "head start with Dart"

ith language SDK. Networking, storage and media support are among them. Dart is described to provide features like async/await, generator functions, string interpolation and much more [1]. And debugging applications on devices both emulated and real makes this process more exciting because hot and hard app reloads occur within seconds.

Unlike usual Android app written on Java, Flutter has a single entry point. All further operations start from the “main” function. One major disadvantage is the reflection absence due to the fact that Dart is processed into the native code and the reflection will cause dozens of code to be generated.

Turning to the interface scaffolding you have the possibility to build adaptive widgets that are based on the native components or created from scratch. You can either create immutable ones, that save their constant state during the view lifecycle, or simply draw them on Canvas. There are also “stateful” widgets that are re-rendered each time the data changes. Besides, placeholder for the asynchronous data can be displayed depending on its execution state. Flutter also supports building flex box layouts, so that widget positioning and sizing are much easier to be built up by the developer.

In conclusion, we want to notice that our work showed that Dart is neither Kotlin, nor Swift, though, it is different and the possibility to code on it must not be skipped.

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Session work №3

CURRENT RESEARCH IN THE FIELD OF ECONOMICS

UDC 323(620)

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PROBLEMS AND MAIN BENEFITS OF DEVELOPING COUNTRIES

Nowadays modern world is concerned about the future of developing countries. The fate of developing world raises more questions than answers. Some scientists and researchers are convinced that developing countries do not have successful future, whereas other are completely sure that Third World countries have great potential. But all economists and policymakers put the greater emphasis on the thing that developing countries are the largest and most diverse group of countries in the world economy. They greatly differ in gross income, size of economy, geographic location, level of development of a market, degree of external debt and the ability to withstand external shocks. Currently the main aim of world governments and international institutions is providing a foundation for sustainable development in developing countries. But unfortunately, it is impossible now, because in developing countries there are many problems to solve. So, we should get to know more about the main drawbacks and benefits of developing countries.

To begin with, we should figure out what does the developing country mean. Various terms are used for countries not considered a developed country. A developing country, also called a less developed country (LDC) or an underdeveloped country, is a nation with a less developed industrial base and a low Human Development Index (HDI) relative to other countries. However, this isn't a universally agreed-upon definition, nor is there agreement on which countries fit these two categories. The definition "developing" describes a currently observed situation and not a changing dynamic or expected direction of progress. During last few decades developing countries tended to demonstrate higher growth rates than developed countries, despite of all their problems. American economist and political theorist Walt Whitman Rostow suggests that developing countries are in transition from traditional lifestyles to the

modern lifestyles which began in the Industrial Revolution in the 18th and 19th centuries.

Committee for Development Policy, CDP allocates several indicators of classification developing countries:

1. Developing countries include in decreasing order of economic growth or size of the capital market:

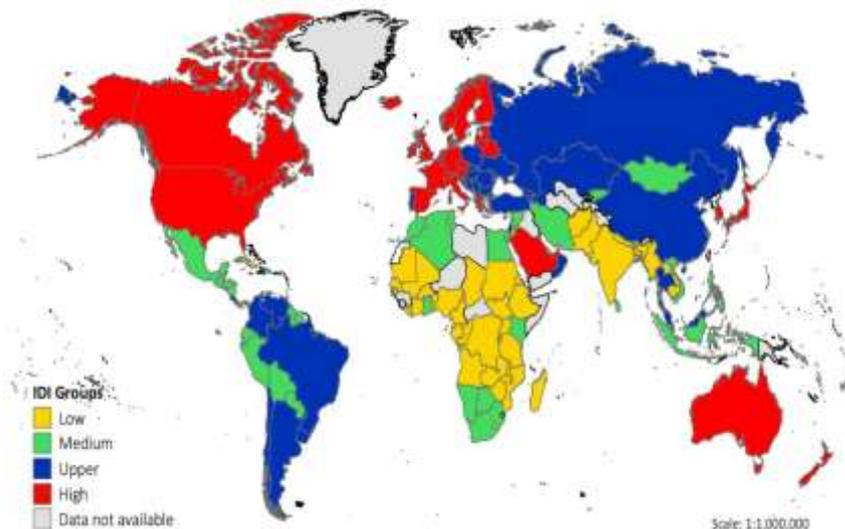
- newly industrialized countries (NIC – countries whose economies have not yet reached a developed country's status but have great economical potential);
- emerging markets (country that has some characteristics of a developed market, but does not matches standards to be a developed market);
- frontier markets (a type of developing country which is more developed than the LDC, but too small to be considered an emerging market);
- least developed countries (LDC –marked by the lowest indicators of socioeconomic development)

2. Developing countries can also be graded by geographic location:

- Small Island Developing States (SIDS) (small countries, including growing populations, limited resources vulnerability to external shocks, excessive dependence on international trade);
- Landlocked developing countries (LLDC).

In 2016 The World Bank classifies countries into four income groups, based on GNI percapita. The four categories in US dollars were [picture 1]:

- 1) low income countries: \$1,025 or less;
- 2) lower middle income countries: \$1,026 to \$4,035;
- 3) upper middle income countries: \$4,036 to \$12,236;
- 4) high income countries: \$12,237 and above.



Classification of developing countries in 2016 (classified by The World Bank)

On the picture 1 we can see that almost all developing countries are situated in Africa and South Asia. These regions are considered to be the most neglected and need economic and social reconstruction. Let`s find out the main drawbacks of the countries of these regions. The first one reason which is singled out by the UN is very low income. Developing countries get most of their income by selling farming products

and raw materials. Average monthly salary in these countries ranges from 10 to 50 dollars per month. As far as we can see almost all people live in poverty because the even do not have enough cash to buy necessary goods.

The next problem is external debts. LDC`s governments borrow money and accumulate enormous debts which they cannot pay back. For example, external debts of African countries during last two decades has grown more than 2 times (250 billion dollars in 1990-s – 550 billion dollars in 2000-s). Today, the leaders of the world`s developed countries want to write off all the debts of the underdeveloped countries of Africa because they consider them hopeless.

The third disadvantage is hunger and starvation. In Africa droughts cause food shortages and almost all countries are dependent on food imports.

Another drawback is unemployment. Almost 50% of population of development countries, especially young people, do not have a job, and another part works in farming. There are lack of educational institution, recruitment companies. Market infrastructure cannot develop there because of huge number of unskilled workers. Researchers have found out that more than 200 million children under five years of age in developing countries do not reach their developmental potential.

Very important factor is deficit of infrastructure. Practically all LDC`s countries do not have basic services that their residents needs. For example there are not enough roads for transportation and convenient transport. They do not have enough social service companies.

One more problem is extreme population growth. Many developing countries grow at the rate of up to 3% per year or even more.

Exploding cities is probably the most negotiated problem of the modern world. Most villagers leave their motherlands in search of greener pastures. But they live not in the convenient flats, but in slums, ghettos and shantytowns. As we can see in the news reports and in social nets, big cities in developing countries are overcrowded and do not have enough facilities for new citizens.

The next characteristic is low life expectancy. People in developing countries does not leave as long as people in developed countries. European countries have an average life expectancy of over 80 years, in central Africa people live an average 50 years.

We should also mention sanitation. Many developing countries lack of clean water. Population use dirty water to meet their daily needs.

Corruption is extremely important problem too. Money does not reach the people who really need it. It is rather used in government projects and buying weapons.

Political conflicts probably have become the oldest problem of developing countries. Many LDC`s countries still suffer from the effects of colonialization. Conflicts inside of the countries cause power struggles and unstable governments . In some countries still are facing with civil wars.

But what about the benefits? Modern economists Dani Rodrik, Philippe Mario Aghion and Maurizio Bussolo are convinced that even before one generation changes, the main role in the sphere of world savings and investments will be played by developing countries. By 2030, half of the world's capital, i.e. 158 trillion US dollars will fall on the countries of the developing world, and today their share is less than one-third.

Another acceleration factor is the increase in the number of young people. By 2020, i.e. less than 7 years, the growth of the working-age population will be provided only by developing countries. If we consider that the total population of developing countries will increase by more than 1.4 billion by 2030, then all the benefits of the demographic dividend have yet to be felt, especially in the relatively more "young" regions of sub-Saharan Africa and South Asia. By 2030, more than 60 percent of the total employment will be employed in the services of developing countries, and they will account for more than 50 percent of world trade.

And now let's look at the main provisions by regions. East Asia and the Pacific region will witness a clear decline in the saving rate and an even more significant reduction in the investment rate, although by international standards these indicators will still be high. And in 2040 the region will be characterized by one of the highest in the developing world, the coefficient of demographic burden.

The region of Latin America and the Caribbean, where the level of savings has never been high, could become by 2030 the region with the lowest level of savings. Although demographic changes will play a positive role, due to the expected decline in demographic pressures up to 2025, the development of the financial market and moderate economic growth will play the role of a counterweight.

The Middle East and North Africa - this region has a significant potential for the development of a financial market that is able to provide investment, and - with aging populations - can lead to a reduction in savings.

In Sub-Saharan Africa, the investment rate until 2030 will be stable due to the high rate of labor force growth. Along with this, there is a likelihood of a shift in the financing of infrastructure investments towards increased private sector participation and a significant increase in private capital flows, primarily from other developing.

How we can see the developing countries are very contradictory. On the one hand, they seem to us places completely unadapted for a normal life, and on the other, we see in them a potential future world economy.

Whether it is destined to come true to all forecasts of economists and politicians will be shown only by time, but for now we have what we have. The main task of the modern world is to improve developing countries and their further preparation for entering the world arena.

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ORGANIZATION OF ENTERPRISE MARKETING ACTIVITIES

In today's conditions, the formation of the mechanisms of enterprise activity that would ensure its effective functioning on the market is fundamental. An enterprise product or service may simply remain unnoticed by consumers. To solve this problem, the enterprise should actively use marketing tools and build its activities based on the chosen marketing concept.

The classic theory of marketing involves the use of marketing mix – a set of marketing tools, the certain structure of which provides the achievement of the set goal and the decision of marketing. The marketing mix offered by J. McKarty, an American marketer, includes four elements: Product, Price, Promotion, and Place.

A product is an item built or produced to satisfy the needs of a certain group of people. The product can be intangible or tangible as it can be in the form of services or goods. All in all, marketers has to ask themselves the question «what can I do to offer a better product to this group of people than my competitors?»[1].

The price of the product is basically the amount a customer pays for to enjoy it. Price is a very important component of the marketing mix definition. It is also a very important component of a marketing plan as it determines firm's profit and survival.

Placement or distribution is a very important part of the product mix definition. Companies should consider certain aspects while developing their distribution strategy, like: product properties, the distance to the consumer, delivery times etc. So, the company can choose such types of distribution as: the distribution of goods independently, the use of only one intermediary or the use of several intermediaries[1].

Promotion is a very important component of marketing. The main goal of the promotion process is to stimulate demand. Promotion is comprised of various elements like the sales organization, public relations, advertising, personal sales. The combination of promotional strategies will depend on budget, the companies, which want to communicate, and the target market[2].

However, at the current stage, traditional marketing solutions may show insufficient efficiency. Therefore, it is important to apply modern marketing solutions. Marketers should actively use digital technologies while working, actively use the Internet and social media, which can become quite effective means of promoting goods and services and help to create a positive image of the company.

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MICROFINANCE AS A TOOL OF ENSURING GENDER EQUALITY IN WOMEN ENTREPRENEURSHIP

This study aims at investigating the issue of women's inequality in economy and finding ways to facilitate women's entrepreneurship potential and thus ensure gender equality by means of microfinance tools.

In many scholars' definitions, the term "gender" refers to social, behavioral and cultural characteristics, expectations and norms associated with belonging to the female or male sex. The notion of "gender equality" describes the relationships between women and men determined by these aspects, as well as the resulting differences in their capabilities (L. Benveniste, A. Kuduel, J. Das, M. Goldstein, A. Maria Munios Bey and K. Sanchez-Paramo, S. Akhtar et.al.).

Gender equality has strong impact on world development in all spheres. With respect to economy, it can increase economic efficiency and improve other outcomes in three possible ways. Firstly, the removal of barriers that prevent women from obtaining equal access to education, economic opportunities and means of production can provide a large-scale increase in productivity, which appears especially critical against the background of increased competition and globalization in the world. Secondly, raising the status of women contributes to many other development outcomes, including women's impact on future generations' development. Thirdly, gender equality can also have a strong influence on the world labour force structure. Statistically, nowadays women account for more than 40 % of the total labour force, 43% – of agricultural workers and more than half of university students in the world. To have the biggest economic output, it is necessary to use the skills and talents of women in those activities in which their potential will give the highest result [3].

Gender discrimination, including segregation in economic activity, covers the following aspects: gender gaps in salary levels, men and women's different responsibilities in household and their role in the family, inequalities in assets ownership, and obstacles women face in both private and public spheres.

The most significant obstacle is the discrimination of women in entrepreneurial activity. Barriers include lack of access to education and limited access to information and communication technologies, market information and finance. The number of women-owned small and medium-sized enterprises (SMEs) with reliable funding sources is small, partly because land is often required as collateral for a loan in the regions where women make up a small minority of landholders.

There exist many international organizations that help women to set up their own business. For example, National Association of Women Business Owners (NAWBO) founded in 1975, positions itself as ‘the unified voice of over 9 million women-owned businesses in the United States’ and is the only dues-based organization representing the interests of women entrepreneurs across all industries. Business and Professional Women's Foundation aims at creating successful workplaces that embrace and practice diversity, equality and work- leisure balance. Women's Microfinance Initiative has the mission to establish village-level loans and hubs administered by local women, to provide capital, training and support services to females from rural districts [1]. An increase in the number of such organizations has contributed to the growth of female entrepreneurs in the world.

Engaging more females in economic activities has recently become an effective way to overcome the inequality of women. The Asia-Pacific region (ASEAN) with the increased number of women entrepreneurs is one example of this. Women entrepreneurs in ASEAN countries have been particularly successful. Today the proportion of firms with female owners stands at nearly 70% in the Philippines, over 60% in Thailand and over 50% in Vietnam. This has been achieved through gender-responsive budgeting, programs to support SMEs, and strong civil society advocacy to ensure women's entrepreneurship prioritized in the national policymaking [6].

While the number of women entrepreneurs in developed countries has increased, the issue of inequality has remained particularly acute in developing countries. Since it is women who represent the main target group of microfinance organizations in developing countries, microfinancing women's business is one of the tools to achieve the goal to overcome gender inequality there.

In terms of economic theory, microfinance traditionally refers to specific financial and credit relations between financial organizations and small forms of management in conditions of territorial proximity and personal contact, involving the accumulation of financial resources and their simplified provision on the principles of pay back, short term, repayment, trust and targeted use for stable economic development. The goal of microfinance is to create a highly dynamic and efficient system of lending to small enterprises to further stimulate the production and distribution of goods and services, and to support start-up entrepreneurs in acquiring the experience of making a profit and accumulating capital [2].

Microfinance gets its popularity and fame from Mohammad Yunus, who in the 1970s began experimenting with lending to poor women in the village of Jobra (Bangladesh) during his tenure as a professor of Economics at Chittagong University. Since then, various forms of microfinance programs have been successfully implemented in many countries. For example, in Bangladesh, as in many other countries, women do not face equality with men in a household or a community.

Families benefit, too, from loans granted to women. Providing women with microloans raises their status, gives them more influence in the family, and also helps to empower them by giving them self-confidence: it makes women feel important

members of both – the family and the community, and allows them to play an active role in combating poverty [4].

Conceptually, microfinance enables poor women to engage in income-generating activities that help them become financially independent and strengthen their decision-making power within the household and society. As economists agree, microfinance has the potential to reduce gender inequality. In 2016, the global index of microfinance was 84% for women and 16% for men. In Eastern Europe and Central Asia these figures resulted in 54% for men and 46% for women; in South Asia – 8% for men and 92% for women; in East Asia and PACIFIC – 6% for men and 94% for women; in Latin America and the Caribbean – 34% for men and 66% for women; in Africa – 34% for men and 66% for women; in the Middle East and North Africa – 40% for men and 60% for women) [5].

To put the issue in the long-term perspective, it's worth highlighting that gender discrimination has significant impact on global world economic development. Gender equality can produce positive effect on labour market and more rational resources allocation all over the world. Gender equality can be implemented through breaking various barriers for women that list above. Using microfinance as the tool will enable women with low incomes to get engaged in income-generating activities, which, in its turn, will help them become financially independent and enhance their role as decision-makers within the household and society at large.

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YEP INCUBATORS AS THE PASS TO UKRAINE'S INNOVATIVE FUTURE

Nowadays, one of the main problems of our country is the migration of the best young and clever graduates to some other countries where they see the prospects of building a successful career. It happens so, because the students of universities are certain about Ukraine's disability in providing them with the innovative technologies they want to study and work with. That is why, they usually get hired abroad and the country loses the perspective, smart and creative potential specialists all along. [1, c.77] But what would happen, if we could change this situation and not by creating some special machines and mechanisms, but making the consciousness of entrepreneurs in our heads?

There are business incubators and accelerators that allow students make start-ups without interrupting their study. [2, c.4] One of several business incubators in Ukraine is called YEP and it works at 10 or more universities all along the country, including Zhytomyr State Technological University.

It started as a small idea, but turned into the big motion. An abbreviation YEP stands for Youth Entrepreneurial Partnership, which means that the purpose of founding your own start-up within an incubator is to establish communication with students, professionals and business advisers. Moreover, the whole idea of YEP is about challenging yourself to start your own business and gain a success.

People, who take part in the whole program, get educational lectures and workshops, mentor speed-dating, consulting from modern entrepreneurs and practice in doing their own businesses. The most pleasant thing is that YEP residents get all of it for free, giving their free time in return. So, they don't have to search for a job somewhere, because they already establish their own space of creativity using resources of the university they study at. In my opinion, it is an amazing possibility.

The second half of business incubator activities is organizing the whole process of study. This part is also accomplished by students. People who take the responsibilities of holding the program are called the operational teams. They learn how to be a functional team and work as a single organism to provide the YEP residents with lectures, space and any help needed.

The operational team members learn how to manage the projects. They go from zero knowledge to absolute self-confidence in their moves. They use modern methodologies, innovative technologies and soft skills to be able to run an entire community, which YEP ZSTU is about to become. Therefore, one of the biggest reasons why a person should do this is getting experience in dealing with problems and solving them. And this is also the job people get well-paid for.

I joined the YEP incubator this autumn as a member of an operational team. My job was to organize all the lectures and events and look after our start-ups' education.

There were three of us in the team, and I am very proud of what we have done. Together we have managed to establish a new community inside the university, although it was a very difficult job.

This winter two other members of my team left, so I had to start the new season of the incubation called YEP Starter on my own. The preparation had a lot of tension, but I am still very much satisfied with results. Today YEP Starter includes three developing start-ups, a few independent residents and a new amazing operational team. We do our best to engage more students and to unlock all the potential that this programme gives us.

Actually, YEP ZSTU has a lot of benefits to propose. This activity already counts an internship or practice that all the students have to pass. The residents of the incubator have a right to claim for rector's scholarship and operational team's members have a very high chances of getting an actual job. We also strive to accomplish our own co-working space, which we all think about. And this is just about a half of advantages that YEP ZSTU can give our students.

The bottom line is that you don't have to move to another country to become happy and find your true definition on this planet. In fact, you can stay where you are and become even more successful than you thought you would be. That demands using all the possibilities and potential you have, of course, the result is worth it.

You never know, until you try. And YEP is specially made for those incredible people who have the courage to try something fresh and new. For those, who are ready to get up, start working and never look back, until their dream comes true.

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TAXATION REFORM IN UKRAINE

Taxes are the main source of funding for medicine, education, national defence, culture, science and other spheres of public life. Effective tax reform can improve the lives of all citizens. In our country, tax reform started in 2015 and is still being performed.

The main goals of taxation system reform:

1. to solve the problem of tax evasion;
2. to decrease the level of tax liability (burden);
3. to regulate the norms of tax legislation [2].

The tax system should be simple and transparent and should require a streamlining of government resources for the administration and collection of taxes.

At present, some **positive improvements** have been achieved by the government of Ukraine, namely:

1. the state fiscal service transformed into the service department;
2. created an electronic database of taxpayers;
3. the system of electronic managing of value added taxes (VAT) and excise taxes minimizes the contacts between tax payers and tax collectors, thus enhancing monitoring while reducing corruption of fiscal service employees [4].

As to the **key challenges** of this process they are:

1. the numerous changes in tax legislation violates the principle of stability. It makes impossible quality planning of work and leads to errors;
2. the issue of tax police reform is not resolved;
3. insufficiently considered actions and imitation of reforms cause confusion and resentment among the people [6].

Possible solutions of the problems:

1. to study the practice of the tax system functioning in other countries;
2. to establish a system of government accountability for the reform process of the taxation system;
3. to promote public awareness of the benefits of the tax payment process and a fair distribution of government resources [3].

Taxpayers should see the efficacy of their taxes and experience this efficiency personally.

Only by following the principle of, "I care about the country, and then the country takes care of me", it is possible to build a strong economically developed state.

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CONCEPTUAL APPROACH TO EVALUATION ABILITY TO REALIZE INNOVATIVE POTENTIAL OF ENTERPRISES IN CONTROLLING

The improving of efficiency of resource allocation in controlling is by effective functioning of the circuit of implementation of management decisions, which including technical and technological, commercial, institutional and administrative capacity of organization system of its management to implement (its management decision) in current activities of the entity.

However, the possibility of enterprise management system can be completely offset by existing information field in which they operate. The informative field provides the balanced work of the system of support, acceptance and implementation of administrative decisions and as a result of receipt of synergistically effect from the use of present resources of enterprise. A synergistic effect in controlling of innovation activities can be obtained only if the operation of the integrated system of monitoring internal and external environment of the company. Such a monitoring system should include an assessment of innovation processes, innovation and integrated functioning of innovation. Farther shortly stopped on each of the constituent elements of such an assessment.

A technical and technological capacity to implement innovative development plans provides proof of the innovative idea to create a competitive product or process. It depends on the availability and capacity of research & D business units to produce new knowledge and create on their basis new and modified products and processes.

In the absence of such units technological innovation capacity depends only on the adaptability of production capacity to respond to market needs. Their innovative development can only be ensured through external knowledge and technical capabilities to implement this knowledge into the practice of business.

Commercial ability to implement innovative development plans depends on the ability of the enterprise to ensure effective promotion of new products and services to market.

Among its elements necessary to distinguish: market, financial and patent licensing. Administrative capacity to implement innovative development plans depends on the ability of control system to perceive and quickly adapt to the needs of innovative projects. Among its elements necessary to distinguish: intellectual, human resources, information and interface.

We turn to the characteristics of the second block of assessing the ability to realize the innovative potential of enterprises. This unit has the most diversified and structured set of information sources that contribute to the innovation of the entity. In controlling ability score synergy should be made in the light of the system's management to effectively implement innovative processes, innovative projects and to

ensure optimum performance of all elements of economic system in constant transformation necessary for innovation development. The choice of these criteria is coincidental. It allows creating an information field that will provide:

- creation and continued expansion of the knowledge base of the enterprise for the purpose of innovation development;
- reducing the number of intuitive management solutions in the field of innovation development;
- development stages of transition to new operating conditions of the entity;

The ability to realize the potential of the innovation process should not be limited to the scope of internal research and experimental-design potential. Domestic engineering enterprises in their work should be widely used as a result of External research, the results of the monitoring needs of the market, knowledge (external to the company) and the knowledge gained in the process of learning by doing. Realization of the innovation process involves the separation of two components: a search and implementing. The end product innovation is implemented innovative projects that should be structured by type of Oslo Recommendations: food, process, marketing and organizational. Innovation activities innovation projects act as centers of responsibility in controlling. Accounting by responsibility centers takes into consideration the full (permanent) information flow. For successful operation of domestic machinebuilding enterprise need to assess all types of innovation that can bring commercial effect of increasing current income and growth of the competitiveness for the long term.

The assessment of the actual and future innovation potentials needs to provide for the effective functioning of the enterprise innovation in controlling. General functions of innovation management are made and provide planning, organization, motivation, control, regulation and coordination of innovation activities of enterprises on the basis of this assessment.

The offered approach to evaluation of ability to realize the innovative potential will assist to developing administrative decisions that will increase the effectiveness of the management process in general and innovation activities in particular. These management decisions must ensure the reduction of market threats and implementing innovative possibilities.

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DIE EFFEKTIVITÄT DER NUTZUNG DER HAUPTMITTEL IN EINEM UNTERNEHMEN

Die Tätigkeit eines beliebigen Produktionsunternehmens ist untrennbar verbunden und durch das Vorhandensein, die Möglichkeiten zur Heranziehung und die Effektivität der Nutzung der wirtschaftlichen Ressourcen bedingt, unter denen die technischen Ressourcen der Subjekte der Wirtschaft den wichtigen Platz einnehmen.

Zu der Studie der wichtigsten Aspekte der Verwaltung und Wiedergabe der wichtigsten Mittel haben einen wesentlichen Beitrag solche bekannte in- und ausländische Wissenschaftler wie S. F. Pokropivny, M. G. Greshchak, M. S. Gerasimchuk, M. D. Bilyk, M. A. Bolyukh, M. Melnik, A. V. Pavlovsky, v. Savitskaya, N. M. Bondar einen wesentlichen Beitrag. Die Dynamik der modernen Arbeitsbedingungen, die Konkurrenz erfordern die Vertiefung der bestehenden theoretisch-methodischen Bestimmungen im Bereich der effektiven Nutzung und Reproduktion der wichtigsten Unternehmen, machen das Thema der Untersuchung aktuell.

Die Hauptmittel bilden die Grundlage des Produktionspotentials des Unternehmens, sie sind ein integraler Bestandteil des Vermögens des Unternehmens. Die Hauptmittel beeinflussen die Selbstkosten der Produktion (Waren, Arbeiten), die Bildung der Kennziffern des Finanzzustandes des Unternehmens.

Der Übergang zum Marktwirtschaftssystem ist ohne die Lösung der Frage der Erhöhung der Effektivität der Nutzung von Hauptmitteln und der Produktionskapazitäten unmöglich. Von der Lösung dieses Problems hängt der Standort des Unternehmens in der Wirtschaft, seine finanzielle Lage, Wettbewerbsfähigkeit auf dem Markt ab. Das technische Niveau, die Qualität, die Zuverlässigkeit, die Haltbarkeit der Produktion hängt von der qualitativen Bedingung der Technik und der wirksamen Nutzung ab und die bestimmen die Effektivität der Produktion. Im Gegenzug sieht der Prozess der Verwendung von Grundmitteln einen allmählichen Verlust ihrer Nützlichkeit und damit Möglichkeiten der produktiven Nutzung in den Produktionsprozessen.

Die Hauptmittel sind materielle Vermögenswerte, die das Unternehmen enthält, um sie bei der Produktion oder Lieferung von Waren zu den Verbraucher zu verwenden, die Dienstleistungen zu geben, den anderen Personen zu vermieten, die administrativen Funktionen durchzuführen. Den Umfang, die Dynamik und die Struktur der Hauptmittel werden durch verschiedene Faktoren beeinflusst, durch den Zweig der Produktion (verarbeitend, Rohstoff -); den Charakter und die Besonderheiten des Produktionsprozesses (diskret, ununterbrochen); die Technologie der Produktion; die Form der Organisation der Produktion (die Konzentration, die Spezialisierung, die Kooperation, die Kombination); die Methoden der Organisation der Produktion. Das individuelle Verhältnis der Hauptmittelgruppen schafft eine Struktur, die aus den

Produktions- und Nichtproduktionsanlagen besteht. Im Gegenzug sind die wichtigsten Produktionsmittel für die Tätigkeit des Unternehmens wichtig, weil sie in einem Prozess der Produktion beteiligt sind, ohne ihre natürliche Form zu verlieren. Die Kosten für die wichtigsten Produktionsmittel werden teilweise auf die Kosten der Produkte bei der Nutzung übertragen.

Die Produktionsanlagen werden in aktive: Arbeitsmaschine und Ausrüstung, Fahrzeuge, Computer- und Laborgeräte und passive: Gebäude und Haushaltsgeräte unterteilt. Die nichtproduktiven Hauptmittel nehmen nicht an der Produktion teil und tragen ihre Kosten für die Produktion nicht. Dazu gehören die Wohnhäuser der sozialen und kulturellen und häuslichen Dienstleistungen, die sich auf dem Gleichgewicht eines Unternehmens befinden. Im Allgemeinen kann die Verwaltung der wichtigsten Mittel des Unternehmens auf zwei Hauptaufgaben reduziert werden: die Verwaltung der Bildung und Verwaltung der Effizienz der Nutzung der wichtigsten Mittel. Anlagenwirtschaft ist wichtig im Hinblick auf die Gewährleistung der Tätigkeit eines Unternehmens, denn von der Effizienz ihrer Nutzung hängt nicht nur die Wachstumsrate der Produktivität, Produktionsvolumen, als auch die Verbesserung der Qualität von industriellen Produkten. Die Wirksamkeit der wichtigsten Mittel ist das Ergebnis in Form einer Wirkung, die mit den verbrauchten Ressourcen verglichen. Die Verbesserung der Effizienz ist es, die größten Ergebnisse bei der entsprechenden Entwicklung der Produktivkräfte im Vergleich zu den Arbeitskosten für die Schaffung eines öffentlichen Produkts verwendet zu erzielen.

Die Effizienz der Nutzung hängt von der Wachstumsrate der Produktivität, der Produktion, der Verbesserung der Qualität der industriellen Produkte und anderen Indikatoren ab. Das Management der Effektivität der Anlage erfordert eine angemessene Informations- und analytische Versorgung, stellt die entsprechenden Anforderungen und legt besonderen Wert auf die Notwendigkeit, eine rationale, relevante und zuverlässige Analyse der Anlagen. Die Hauptaufgaben der Analyse der Hauptmittel sind:

- Bestimmung der Effektivität der Arbeitsmittel;
- Bestimmung der Kennziffern der Nutzung der Produktionskapazitäten und der Hauptproduktionsmittel;
- Bestimmung der Zusammensetzung und Dynamik der Anlage;
- Identifizierung der Auswirkungen der Verwendung von Grundmitteln auf das Volumen der Produktion, Produktionskosten und andere Indikatoren.

Die Hauptphasen der Analyse der Effektivität der Nutzung der Hauptmittel sind:

- Allgemeine Studie des Volumens der Anlagevermögen im Unternehmen;
- Diagnostik des Wachstums der Hauptmittel FR verschiedene Perioden der Tätigkeit eines Unternehmens;
- Bestimmung des Verhältnisses der Gruppen im Gesamtwert der Mittel, sowie die Struktur;
- Bestimmung der aktiven Teil der Mittel;
- Festlegung der Gründe für Änderungen Ihrer Volumina und Strukturen;
- Evaluierung der Verwendung von Grundmitteln;

- Verallgemeinerung der Informationen, sowie die Entwicklung der Richtungen der Erhöhung der Effektivität der Nutzung.

So wird es die Forschung der Effektivität der Nutzung der Hauptmittel vorgeschlagen in vier Hauptetappen durchzuführen:

- Technischer Zustand der Anlage;
- Aktualisierung der Anlage;
- zusammenfassende Indikatoren für die Wirksamkeit der Anlage;
- Bestimmung der integralen Indikatoren der Effektivität der Nutzung des Anlagevermögens.

So sind die wichtigsten Mittel durch die Vielfalt der Manifestationen gekennzeichnet, betont die Bedeutung Ihrer Rolle bei der Gewährleistung der wirtschaftlichen Tätigkeit des Unternehmens. Folglich ist die Bildung einer wirksamen Managementpolitik die Voraussetzung für Wettbewerbsfähigkeit, Nachhaltigkeit und nachhaltige Entwicklung eines Unternehmens.

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FINANCIAL SUPERMARKET – HIGHER STAGE OF BANKS INTEGRATION WITH OTHER FINANCIAL INSTITUTIONS

Actuality of theme. In today's conditions of financial market development in Ukraine, the issue of investment funds attraction, due to temporarily free funds of business entities and households, is actual.

The research aim is to explore the financial supermarket as higher stage of banks integration with other financial institutions.

Analysis of recent research and publications. At the same time, the most effective way of activation this process among financial institutions is the interaction and integration between financial institutions. The highest degree of such interaction is financial supermarkets.

There are 2 basic approaches to determination of financial supermarket:

1. Financial supermarket - an institution that provides customers with a wide range of financial services. Such an approach is followed by such authors as S. Reverchuk, I. B. Medvedev and Yu.V. Smirnov

2. Financial supermarket - a system that unites people to facilitate transactions, including the purchase / sale of securities, commodities and other operations to reduce the fees for services provided within the existing market. In turn, this approach is supported by: A. Lukash, V. A. Kozyrev and M. V. Rysin.

Thus, a financial supermarket can be considered as an association of financial institutions that provide a large variety of services - banking, leasing, investment, insurance and others. The financial supermarket operates in 3 models: American, German, and British. Also has its own kind of mechanism of operation.

In the American model, the financial group consists of non-dependent financial institutions, such as: banks and non-bank financial institutions that are independent entities, but are obeyed to the same owner. In Ukraine, an example of a US model of a financial supermarket is the Ukrainian Financial Group, which includes: Ukrainian Financial Group, Ukrainian Financial Group Investment Company and Ukrainian Insurance Company UTICO. One example is VAB Group, which is represented by VAB Bank and VAB Express, which serves consumer lending to private clients.

The financial supermarket in the German model is created solely on the basis of the conclusion of distribution agreements and is not based on a strong financial institution and presented as a consultant. A striking example of such a model in Ukraine is the Mega-Polis company. Which is a counterpart to leading banks, legal and insurance companies, car dealerships. In most cases, financial supermarkets are provided at the expense of commission fees from their partners.

The basis of creating a financial supermarket in the British model is the parent bank and financial institutions under its control. An example of this financial supermarket is OJSC "JSCB" UkrSibbank "on the Ukrainian market. The head of which is the financial group "BNP Paribas Group" (France), which holds the predominant shareholding. OJSC JSCB "UkrSibbank" in addition to classical banking services also provides a number of services of an investment nature.

The first financial supermarket in Ukraine, which declared itself, is the TAS group. The main objective of which is the accumulation of assets of the financial sector of Ukraine. The interests of the group are represented in most business areas in this segment of the economy. Namely: risk and life insurance, financial intermediation, banking, leasing and others.

Another example of the financial institutions integration in Ukraine is the EWA platform. EWA is a software product that comes as a service (SaaS), an insurance platform that connects insurers and intermediaries such as banks, agents, brokers and others. With EWA, data exchange between financial institutions becomes easier and faster. You can use EWA with: web interface, mobile applications for Android platforms, IOS, WinPhone.

Soon in Ukraine there will be a new kind of financial supermarket, which will be presented by "Ukrposhta" and bank "FUIB". This kind of financial supermarket is created for ease of banking services usage for residents of small cities and villages. Ukrposhta will distribute its services to FUIB Bank in its departments.

Conclusions. However, the process of integration in the financial market of Ukraine has a number of problems, such as the division of income, the inconsistency of economic interests, and others. Integration should be aimed at reducing the cost of providing financial services and improving their quality and, therefore, in our opinion, is a promising study of the organizational and legal mechanism of the financial supermarket functioning. This form of banks integration and other financial

institutions has proved effective, and has become widespread in many developed countries of the world.

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STRATEGIC CUSTOMIZATION OF WORKERS AS BACKGROUND FOR INNOVATIVE DEVELOPMENT OF THE ENTERPRISE

The aim of the article is to present the results of research on the analysis and generalization of methodological approaches to differentiation of workers by roles in relation to the chosen strategy of innovative development of enterprise. [1, p. 320]

This article provides a meaningful analysis described in the literature and those used in the practice of foreign companies' concepts of differentiation jobs, professions (positions), workers under the corporate strategy. The main value in the context of solving this problem is the approach to differentiate workers proposed by M. H'juzlid, B. Bekker and R. Bitti. [1, p. 321]

They see three levels of differentiation strategies workforce:

- strategy "basic best practices",
- strategy "basic differentiation of labor"
- strategy "strategic customization workforce". [1, p. 321]

The three-level strategies in the article presented as transformation of labor into a strategic asset of the enterprise, which is the foundation of HR-management system. Foremost in the developed continuum of differentiation strategy takes "customization workforce" as anticipatory in context of achieving goals identified in the activities. [5]

Job customization, sometimes called job carving, is a term for customizing job duties. It is a way of combining tasks from different jobs to increase employee productivity while capitalizing on the skills and strengths of workers who identify as

having disabilities. Job carving is all about creating a new position by freeing specialized employees from having to perform unspecialized tasks. [2, p. 512]

Customized employment is an interest-based evaluation of the business's needs and the job seeker's skills and ability to meet those needs. Customization is meant to be a win-win solution. It works best when a newly created position helps various specialized workers. Successful job carving brings mutual benefits to the employer and the job seeker. [2, p. 513]

The process of job customization creates a new tailored job description that fits a potential employee's skills and strengths. It gives a job seeker with a disability the opportunity to contribute according to his or her capacities. [3, p. 83]

A prerequisite for the development of innovative activity of the modern enterprise are workers, their knowledge, experience and competence. Accordingly, there is a need to develop an approach for the differentiation of workers by roles in relation to the chosen strategy of innovative development of the enterprise. Development of this approach provides a basis for targeted investments in competencies of employees, whose contribution to the goals of innovative development is the most important. [3, p. 83]

As workers in different positions make different contribution to the achievement of the strategic goals of innovative development of enterprise, then the performance of some categories of workers are more valuable than others. This provides a basis for differentiation workers in the degree of contribution to the achievement of the strategic goals of innovative development of enterprise. Solving the problem of differentiation workers concerning their contribution to achieving the goals of innovative development of enterprise can promote the use of tools classification of occupations and positions, such as ranks method, digits method and grading method. [4, p.224]

The article provided a meaningful description of each of the strategies of differentiation workers and identified their strengths and weaknesses in the context of solving the problem of innovative development of enterprise. Based on the comparative characteristics of differentiation workers concluded that the most appropriate strategy for implementation is "strategic customization workforce". This strategy corresponds to the third (highest) level of continuum transformation of labor . It is characterized by high corporate influence, a high degree of differentiation of labor Results form the basis for the integration of strategic customization workers in the process of innovation management according to the number of defined principles and necessary resources. [4, p. 224]

Accordingly, it is necessary to develop an approach to isolating workers, whose contribution to the achievement of the objectives of the enterprise innovation is most important. the guidelines will streamline personnel policy in the enterprise and will create a framework for the development of innovative activity of the enterprise in terms of economy. The basis of this approach in the context of development of innovative activity of the enterprise has become the strategic identification of professions which is an integral part for development of the enterprise. [5]

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LEGAL AND PRACTICAL ASPECTS OF STARTING A BUSINESS THROUGH CENTRES FOR ADMINISTRATIVE SERVICES PROVISION

Introduction. In the conditions of informational, economic and technological progress, business development, the simplicity of its establishment and operation in Ukraine are the key to economic development of the state; a source of the state and local budgets at the expense of taxes and fees; creation of workplaces and strengthening of Ukraine's competitiveness on the domestic and foreign markets, as well as improving the investment attractiveness of Ukraine. Starting up a business involves several steps: the state registration of economic activity; the choice of tax system and registering for tax; obtaining permit documents, including licenses (depending on the type of economic activity).

The aim of the paper is to analyze the legal aspects and organizational components of starting a business in the conditions of decentralization of power in Ukraine through the newly created Centres for Administrative Services Provision, as well as to find out whether such relationships between businesses and local self-governments are appropriate and successful.

Results of research. The administrative services industry in Ukraine began its reformation after the Governmental decree No. 90-r dated 15.02.2006 which approved the Concept of the development of the system of administrative services provided by executive authorities. Furthermore, the reform of this system was accelerated by the

provisions of the Law of Ukraine “On the Permit System in the Field of Economic Activity”.

While, according to the Law of Ukraine “On the Permit System in the Field of Economic Activity”, business services in terms of arranging the issuance of permits were being provided through single permitting offices, which were subsequently transformed into Centres for Administrative Services Provision (CASP), the transition of the state registration of businesses through ‘the single window’ was rather slow [1]. The major initiators of the merger of the two above-mentioned areas of government activities under the ‘single roof’ – in one integrated CASP office – were local self-government bodies, mainly city mayors and executive committees of city councils of cities of oblast significance, which by the Law of Ukraine “On State Registration of Legal Entities and Physical persons-entrepreneurs” were delegated powers of state registration of business entities [2; 3].

On September 6, 2012, on the initiative of local self-government bodies and non-governmental organizations, the Supreme Council of Ukraine adopted the Law of Ukraine “On Administrative Services”, which laid the legal basis for providing services to individuals and legal entities by government and local self-government bodies; arranging provision of these services applying ‘the single window’ approach; legal regulation of CASPs formation and operation, the principles of interaction between CASPs’ administrators and entities providing administrative services as well as between applicants and entities providing administrative services [4].

The introduction of the Law of Ukraine “On Administrative Services” and its implementation enabled provision of business services in most areas of government activity in one integrated office, which allowed business representatives to save considerable time and efforts, to pass the procedures of state registration of economic activity more transparently, quickly and comprehensively, to receive permits, extracts, extracts from single databases (registers), and, what is of great importance, provided an opportunity to minimize corruption risks, in particular bribery [5].

In addition, among the benefits of such centers are the following: the citizen-oriented environment; the non-office system of service which increases both transparency of civil servants’ performance and visitors’ confidence; e-regulation of a queue instead of visitors’ spontaneous ‘self-organization’; maximum informativeness; conditions for people with disabilities; accompanying services (photocopying, bank services, etc.).

At the same time, in 2012-2013 the authorities took a great deal of destructive measures to centralize their powers in administrative services provision, including state registration of business and issuing permitting documents. A number of governmental and presidential decisions of that period caused a grave deterioration of the services provided by authorities to business entities, posing additional corruption risks to entrepreneurs willing to set up a business.

Not until the regime change in Ukraine in 2014 were a number of positive changes made in administrative services provision. Thus, on May 16, 2014, the

Government adopted Resolution No. 523-r, which approved the list of administrative services of state executive bodies, which are provided through centers for administrative services provision. The list included issues of state registration of a business and a full list of documents permitting economic activity. Moreover, the government decentralized the budget and provided opportunities of enjoying administrative services via the Internet.

Conclusion. As the analysis shows, the newly established CASPs have facilitated the legal and organizational aspects of starting a business in Ukraine. In particular, nowadays, a business can be registered or liquidated online. Moreover, CASPs enable citizens to receive information from the URE, to submit a declaration / notice on the commencement of construction, to put the objects into operation, to get an extract from the State Land Cadastre and an extract from the technical documentation on the normative-monetary land evaluation, to register as a taxpayer, to obtain tax information and reporting, etc. via the Internet. All these activities gave a 'second wind' for CASPs development and reformation, as well as expanded the range of services provided through them, including business activities.

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PECULIARITIES OF DOCUMENTATION OF TRANSACTIONS ON PURCHASING SERVICES

Each company uses services in its activity. They are a lease, telecommunication services, transport, as well as services for maintenance of premises, personnel, etc. Nowadays no entity can function normally without services. It is very difficult to provide enterprise with all the resources to carry out economic activity without third parties.

Services cannot be evaluated until they are implemented, as well as they cannot be separated from the process of its provision. Unlike a product, services are consumed at the time of their production and cannot be preserved. The very immaterial nature of services increases the attention of business entities to the accurate compilation of the source documents of transactions on the purchasing services. The source document is essential to the accounting process as it is the evidence that a business transaction occurred. After all, the service cannot be “seen” or “touched”. It encourages some entrepreneurs to hide “non-economic activities” (which, according to the law, should not affect the profit of an enterprise, unlike the usual purchasing of services) behind the “purchasing of services”.

Taking into account the unstable legislative framework for the issue of documentation of transactions on purchasing services the normative base should be reviewed as well as the basic requirements for the source documents should be highlighted.

According to the Ukrainian normative base, there are 6 clauses to consider while compilation source documents:

1) the title of the document (blank). As mentioned above, the typical form of such a source document has not been approved, its title may also vary: the act of work performed, the act of services rendered, the act of acceptance of works / services performed, etc., but it must necessarily correspond to the subject of the contract.

2) date and place of assembly. Due to Ukrainian legislation, there are no requirements to the date of compilation of the source document (except that it is a required detail) as well as according to the law, the place of assembly was removed from the required details.

3) the name of the enterprise, at which behalf the document is drawn up. It is necessary to specify both the components of the name: the legal form and the name of the enterprise.

4) the content, volume and the unit of measurement of the business transaction. This clause raises the most questions, because the content and volume of a business

transaction are the main criterion for including / excluding into tax expense transactions related to the purchase of services. The content of the business transaction is needed to be represented as widely as possible, so that the controlling bodies have no doubts about the reality of its implementation, as well as about the connection of the transaction with the business activities of the enterprise. The degree of transaction disclosure is closely linked to the terms of the contract. If the contract contains an exhaustive list of services, they are characterized in detail, their quantitative and valuable content is clearly described, then the act can be limited to one sentence on the subject of the contract. Conversely, if the name of the service is summarized, the list of services in the act should be precise as possible.

5) titles of persons responsible for the conducting of the business transaction and the correctness of its execution. The list of persons who are entitled to permit (to sign source documents) for conducting an business transaction related to the spending cash and documents, inventories, intangible assets and other property, is approved by the head of the enterprise. The number of persons entitled to sign documents for transactions on the issuance of particularly scarce goods and valuables, forms of strict reporting, should be limited. This restriction is settled by the order at the enterprise level. The order prescribes names or titles (for enterprises with a large staff turnover) of persons entitled to sign documents.

6) personal signature or other data that allow you to identify the person participated in the business transaction. As we know, the signature of the authorized person on the original document is a confirmation of the services accomplishment.

In addition to the clauses described above, the law allows enterprises to add additional data to the source documents (for example, the status of mutual settlements with the counterparty, the list of material values when performing repairs, the contract number, etc.).

Therefore, in conducting an entrepreneurial activity, business entities cannot do without the services of third-party organizations. When buying any service, you need to know how to properly complete the source document, so that you can confidently include it to the costs of the enterprise. Thus, we have concluded that peculiarities of source documents of transactions on purchasing services are as follows:

1. Mandatory availability of information, that makes it possible to identify participants (both legal entities and individuals), who have taken part in the process of acquiring services. Namely: requisite details of the executor and the customer, as well as information about signers of acts.

2. The nomenclature of the act must clearly correspond to the business transaction and must be indicated so that the third person, when looking through the act, could identify the type of service.

3. In addition to all mandatory act requisites, legislation allows to add additional information that is useful to the customer\executor.

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TEAM CHEMISTRY FOR EFFECTIVE PERSONNEL PERFORMANCE

The aim of this study was to look at the personality types that make up a team - and how to get the best from any combination.

Organizations often do not get enough performance from their teams. The fault does not lie with the team members. The reason is that managers do not recognize the difference between their people.

Modern scientists suggest a system called Business Chemistry that identifies four primary work styles based on employees' behaviors at work. It enables developing related strategies for accomplishing shared goals. All employees can be divided into four types. All the styles bring useful perspectives and approaches to generating ideas, making decisions and solving problems. The four styles give teams a common language for understanding how people work. These styles are pioneers, guardians, drivers, integrators.

Pioneers value possibilities. They spark energy and imagination on their teams. They believe risks are worth taking. Their focus is big-picture. They are drawn to bold new ideas and creative approaches.

Guardians value stability, and they bring order. They are pragmatic, and they hesitate to embrace risk. Data and facts are baseline requirements for them, and details matter. Guardians think it makes sense to learn from the past.

Drivers value challenge and generate momentum. Getting results and winning count most. Drivers tend to view issues as black-and-white and tackle problems head on, armed with logic and data.

Integrators value connection and draw teams together; relationships and responsibility to the group are paramount. Integrators tend to believe that most things are relative. They are diplomatic and focused on gaining consensus.

Some examples of the best styles combination are further considered. Pioneers and integrators build relationships; prefer teamwork, express emotions, display flexibility, trust people and ideas. Pioneers with drivers will embrace risk, decide quickly, brush off mistakes, call the shots and try it out. Drivers and guardians build spreadsheets, value individual work, contain emotions, display discipline, question people and ideas. If combining integrators with guardians they will tolerate risk, deliberate decision, internalize mistakes, make it happen, trust the tried and true.

Finally, the article summarizes the common traits that generally apply to one of the four style. A driver is quantitative, logical, focused, competitive, experimental, and deeply curious. A guardian is methodical, reserved, detail-oriented, practical, structured, and loyal. A pioneer is outgoing, focused in the big picture, spontaneous, drawn to risk, adaptable, imaginative. An integrator is diplomatic, empathic, traditional, relationship-oriented, intrinsically motivated, and non-confrontational.

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METHODOLOGY FOR IMPLEMENTATION QUALITY MANAGEMENT SYSTEM AT THE ENTERPRISE

Modern enterprises carry out the activity in constantly variable market conditions. Forming the new competitive environment compels enterprises again to pay a regard to efficiency and quality of produced commodities and services, as those companies which will be able quickly to adapt oneself to such terms and in sharp competitive activity to survive only. Therefore, the system of management of quality must be flexible, that is quickly «influenced» under the changes of requirements of the parties interested in activity of the enterprise. Only such system of management can become a useful instrument in the hands of guidance of enterprise. A standard requires to develop and improve the system of management of quality by application of modern technologies, oriented to effective adaptation to the external environment which changes.

The purpose of the article is the research of the problem of development and introduction of the quality management system as one of backer-ups competitiveness of an enterprise which functions in Ukraine, that in the state with a transitional economy and imperfect competition. [3, p.62-65]

In the article the method of introducing the quality management system at the enterprise has been presented, which is aimed at realization of policy of organization in the sphere of quality and creation of structure which provides effective realization of the set aims. The standard of ISO of 9001- is a real instrument of the increase of activity efficiency, which destroys an enterprise on the new level of development.

Approach to the systems is used to the ground of directions of development and introduction of the quality management system at the enterprise which allowed: to begin the process of forming the corporate culture, based on principles of quality management; to control the activity of enterprise in accordance with the current Ukrainian legislation, standards and recommendations of international organizations; to differentiate services which are given, on the basis of quality, to meet the requirements of users. [5, p.393]

Introduction of SMK – is a difficult project for any enterprise, successful realization of which requires exact knowledge and observance of all of conformities to the law and document. There are certain complications in the project of such scale: separate employees and leaders don't make a strategic decision about creation of the system; a powerful organizational structure, functional management; internal barriers between subsections, incomprehensible general aims of organization, destruction of trust between the different levels of personnel; misbalance of responsibility and plenary powers; low level of culture of production; absence of the expressly formulated vision, mission, general ideology, philosophy, principles of development for all of company;

processes are not described, key processes are not certain and quantitative and high-quality criteria are not measured; absence of the system of measuring the satisfaction of users and marketing. [4, p. 14-16]

ISO 9001- will help to overcome these complications, a real instrument of the efficiency increase of activity, which destroys an enterprise on the fundamentally new level of development. [1]

Introduction of the quality management system will allow the enterprise: to begin the process of forming the corporate culture, based on principles of quality management; to control the activity of the enterprise in accordance with the current Ukrainian legislation, standards and recommendations of international organizations; to differentiate services which are given on the basis of quality, that meet the requirements of users, and also to create pre-conditions for increase of market of organization share; to promote profitability of enterprise by cutting the production costs, which appears due to the increase of level, development of procedures for performing the activity on the basis of the chosen standard, perfection of management, involving the whole personnel, processes of control and providing the quality; to strengthen reputation of enterprise which meets the world standards of quality of enterprise and aspires the permanent increase in satisfaction level of users. [2, pp.17-21]

The solution of the resulted problems needs combining the efforts of professional organizations in the field of quality with the purpose of making the strategy of general actions for the development of market services in the field of quality, creation of highly skilled specialist in a quality management, which will meet modern requirements.

The prospects of further researches can be related to determination of tool and directions of improvement of providing the control of the system, study of possibilities and features to introduce the information technologies of the quality system control by quality by quality at domestic enterprises.

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HEALTHCARE REFORM AND IMPLEMENTATION IN UKRAINE

On January 1, 2018 healthcare reform, developed by the Ministry of Health of Ukraine together with international experts will be launched.

The main objectives of this reform are to improve public health, increase the quality of health care, improve accessibility of health care as well as to change the funding of the health care system. In other words, Ukrainian social healthcare is supposed to secure for every Ukrainian the opportunity of equal access to health services and medicines.

Today, to receive quality medical service, Ukrainians have to pay high informal payments, though free health protection is guaranteed. Every year Ukraine spends on health care 4% of GDP that is significantly more than any other country with a similar income level. Part of the funds actually is lost because of the inefficient use of budget funds, corruption, and the inefficient structure of health care provision. Inadequate funding of medical establishments based on the size of hospital (which requires heating, repairing, etc.), number of employees, and what is more – the number of beds instead of the number of patients who applied and provided treatment.

The introduction of new methods of funding will reduce the current level of informal payments for medical services. Now such payments make about 51.5% of the total expenditure within the branch. The main task of the state is to protect its citizens, that is, to provide them with medical services based on clear and equal rules.

One of the key documents that should start the changes is the Law of Ukraine: “On the state financial guarantees for providing medical services and medicines” [1].

Also an important element in the promotion of the reform is the adoption of the budget resolution for 2018 – 2020. The resolution envisages substantial increasing of fees for the primary care physician (therapist, pediatrician, family doctor) service of the patient per year. According to preliminary calculations, the capitalization rate was 240 UAH, now the government is ready to increase the rate to 370 UAH. In 2018, and in 2019 – 450 UAH per service per person[6].

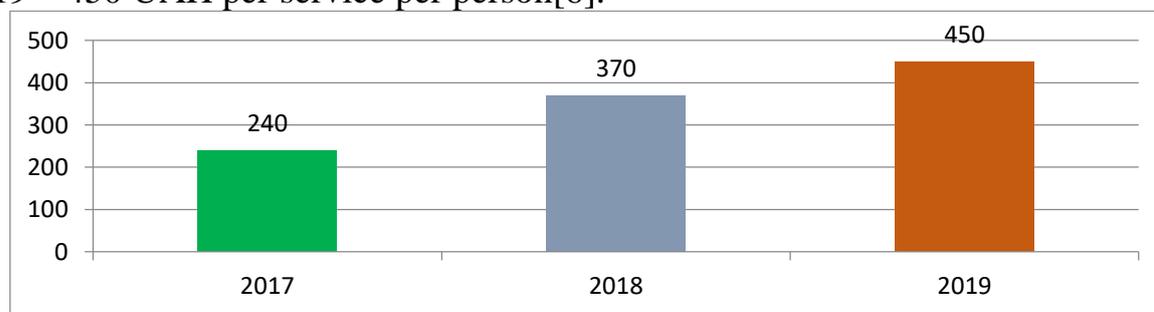


Fig. 1. Comparison of the amount of funding per person in 2017 – 2019. g.

In general, during 2018-2020, the funding of guaranteed package of medical services will be increased from 55 billion, which is today is the medical subsidy, to 81.2 billion in 2020. That is the healthcare funding will be increased by 25.7 billion. in 3 years.

After the implementation of the reform (up to 2021) the level of combined payments will increase by 13% of total health expenditure — 4 times less than it is now [7].

The reform will start with primary healthcare: family doctors, therapists and pediatricians. You can contact your family doctor, therapist or pediatrician as soon as you feel the need for examination or treatment. In developed countries, family doctors who are comprehensively trained and better equipped with medical instruments, the most common tests and medicines solve 80% of patients' applications for assistance without hospitalization.

The healthcare reform will not lead to a decrease in the number of medical institutions, but it will result in changes to healthcare financing, changes in the quality of services and number of physicians [5].

From January 2018, primary care physicians will be paid according to a new model: fixed payment for each patient with whom they signed a contract. At the same time, the amount of payment for treatment of young people and the elderly vary significantly with the increase in the number of applications in connection with age features [2].

It is important to remember that the doctor gets your money even when you are healthy. The less you are ill, the less the doctor will work but his income will stay the same. So, it encourages doctors to take care of their patients well. This model works effectively in the world.

If you already have a doctor that treats you or your family members, just sign an agreement with him. And the national health service of Ukraine will pay your doctor for you. If the doctor who treated you before does not satisfy you, it's time to find someone you are willing to entrust your health.

The regional bodies of the National Healthcare Service (NHS) will check whether the doctor's work meets the requirements of the procedure for the provision of primary healthcare. The draft of the budget of 2018 envisages 210 million UAH for its implementation [7].

The Ministry of Health indicates that NHSU would not have the funds, all funds go to the state budget in the Treasury accounts, and NHSU will perform only the function of the operator – transfers budget funds to medical institutions in accordance with the signed agreements with them. It ensures that patients are provided with medical services within the established amounts and quality. Besides, the National Healthcare Service will receive complaints from patients regarding the quality of services provided by medical institutions as well as the cases of extortion of additional fees from patients [4].

To maintain the accurate recording of services and prescriptions, the Ministry of Health is implementing an electronic health system (E-Health). In the first phase, the system will gather statistics on the treatment of patients. It will contain the number of

provided services and the amount of payments from the budget. The system is to operate beginning April 1, 2018.

The E-Health database will contain information about doctors (education and experience) and their work background (for example, the average duration of consultations, frequency of patients' applications, coverage of the assigned population with preventive procedures, the number of prescriptions for antibiotics, etc). This information will help patients to choose the doctor with appropriate qualification.

Lawmakers have proposed to introduce three types of medical services: free, paid, and combined payment (when the state pays partially). The concept of

“combined” payment was declined by the Rada in the adopted law. Therefore, there is only fully paid medical services (red list) and completely free (green list) [7].

Annually, the volume of services guaranteed by the state and rates will be approved by the Verkhovna Rada according to the State Budget. All rates will be reasonable and transparent. Everyone will be able to see this information on the Internet.

This means that within the state-guaranteed package of medical services, the state will cover 100% of the cost of the treatment including consumables and medicines.

At the same time there will be so-called red list of the services that will not be included in the state guaranteed package. This may be additional services and those that are not vital. For example, cosmetic dentistry, plastic surgery and others. The cost of these services citizens will pay by themselves.

Red list of features will also vary from year to year, depending on what kinds of services are guaranteed by the state [6].

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CASE-INTERVIEW ALS METHODE DER PERSONALAUSWAHL

Unter den verschiedenen Techniken, die von HR-Managern verwendet werden, um den Suchenden zu bewerten (Tests, Fragebögen usw.), ist das Interview mit dem Kandidaten am wichtigsten, weil es Ihnen ermöglicht, einen Eindruck über bestimmte Qualitäten des Kandidaten zu bekommen.

In letzter Zeit ist in der Personalmanagement-Umgebung eine solche Methode zur Bewertung von Kandidaten als Situations- oder Fallbefragung üblich. Dem Suchenden wird eine bestimmte simulierte Situation angeboten oft mit einem Problem oder bietet mehrere Lösungen. Aufgabe des Antragstellers ist, die Situation einzuschätzen ihr Verhalten und effective Lozungen zu vorstellen.

Grundsätzlich wird das Case-Interview bei der Auswahl von Führungspositionen oder zu Positionen im Zusammenhang mit Beratung, Marketing oder Geschäftsanalysen verwendet. Es ist auch effektiv für die Bewertung der Fachleute, ihr logisches Denken, organisatorische Fähigkeiten und öffentliches Sprechen. Bei der Verwendung Case-Interview ist wenige Risiko gelernte Antworten. Normalerweise sind Situationen immer exklusiv und erfordern eine direkte Lösung an einem bestimmten Ort und zu einer bestimmten Zeit. Dieses Interview hilft nicht nur wichtige berufliche Fähigkeiten des Kandidaten zu testen aber auch seine Motivation, Ehrlichkeit, Verantwortung. Die Hauptsache bei der Planung dieses Interviews ist, sorgfältig über die Situation nachzudenken, die die Kandidaten lösen müssen. Es ist sehr wichtig, die Methoden, mit denen der Kandidat versucht, das Problem zu lösen, richtig zu bewerten (allein, mit Hilfe von Freunden, mit Geschäftskontakten usw.) Außerdem wichtig ist ein potenzieller Mitarbeiter mit Kollegen interagiert, ob er den Wunsch zu helfen hat, einen Mitarbeiter zu unterstützen, das gewünschte Ziel gemeinsam zu erreichen.

Recruiter unterscheiden sich sehr in der Beurteilung der Effektivität von situationsbezogenen Interviews. Es gibt Experten, die glauben, dass dies die Top-Recruiting-Technologie ist, aber es gibt andere, die situationsbezogene Interviews für völlig ineffektiv halten. Sie rechtfertigen ihre Position mit solchen Pluspunkten:

- 1) diese Methode erlaubt uns zu verstehen, wie sich der Kandidat in einer "natürlichen" Atmosphäre verhält, das heißt, seine direkte Arbeit auszuführen;
- 2) der Interviewer hat die Möglichkeit, die Situation flexibel zu ändern, wodurch Sie schnelle Antworten auf die Fragen von Interesse erhalten können;
- 3) persönliche Einstellungen werden ebenfalls überprüft.

Zu den negative Seiten dieser Methode gehören:

1) Jede Situation im Interview wird sich von der Situation unterscheiden, in der der Kandidat arbeiten wird. Ein Interview ist immer ein erhöhter Stress, ein begrenzter Rahmen und daher - unrealistisch;

2) Vorbereitung und Durchführung eines solchen Interviews erfordert viel Zeit;

3) Ein Personalvermittler, der ein Case-Interview durchführt, muss genügend Erfahrung haben, um die Ergebnisse richtig zu analysieren.

Beachten Sie jedoch, dass die Bewertung des Bewerbers zu den Ergebnissen des Case-Interviews wird nicht völlig objektiv sein, und diese Methode wird am besten zusammen mit anderen Methoden verwendet, die bei der Rekrutierung von Personal verwendet werden.

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POSITION OF UKRAINE IN GLOBAL RATINGS IN 2010-2016

There are many research in the world that make it possible to outline prospects for developing the financial potential of the state under the influence of changes in state regulation, the country's ability to provide economic growth and create a favorable business climate. Descriptions of the most authoritative global rating are presented in Table 1.

Table 1.

The most authoritative global rating

№	Name	Author (year)	Description	Organization
1	Doing Business	Simeon Djankov, (2003)	The Doing Business project provides objective measures of business regulations and their enforcement across 190 economies and selected cities at the subnational and regional level.	World Bank Group
2	Global Competitiveness Index	Xavier Sala-i-Martin and Elsa V.	The report assesses the ability of countries to provide high levels of prosperity to their citizens. This in turn depends on how productively a	World Economic Forum

		Artadi, (2004)	country uses available resources. Therefore, the Global Competitiveness Index measures the set of institutions, policies, and factors that set the sustainable current and medium-term levels of economic prosperity.	
3	Index of Economic Freedom	Bryan T. Johnson, Thomas P. Sheehy, (1995)	The Index of Economic Freedom scores countries based on twelve factors: property rights, judicial effectiveness, government integrity, tax burden, government spending, fiscal health, business freedom, labor freedom, monetary freedom, trade freedom, investment freedom and financial freedom. These are compiled into a single score, according to which countries are ranked from most (highest score) to least free.	The Heritage Foundation & The Wall Street Journal
4	Corruption Perceptions Index	Johann Graf Lambsdorff, (1995)	The Corruption Perceptions Index scores countries on how corrupt their governments are believed to be. It is published by Transparency International, an organization that seeks to stop bribery and other forms of public corruption. A country's score can range from zero to 100, with zero indicating high levels of corruption and 100 indicating low levels. Transparency International launched the index in 1995, and today it scores 180 countries and territories.	Transparency International

The choice of these ratings (indexes) is related to the widespread use of them in research on the issues of achieving macro-financial stability, balancing public finances and the efficiency of the financial sector. In our opinion, the positions of each country in the listed ratings reflect the level of use of their existing economic potential and financial potential in particular as an integral part of it.

The dynamics of changing the position of Ukraine in the indicated indices in comparison with other countries is presented in the table 2.

Table 2.

Position of Ukraine in global ratings

Ratings	2010	2011	2012	2013	2014	2015	2016
Doing Business							
position of Ukraine	145	152	137	112	96	83	80
<i>number of countries</i>	<i>183</i>	<i>183</i>	<i>183</i>	<i>185</i>	<i>189</i>	<i>189</i>	<i>190</i>

Index of Economic Freedom position of Ukraine <i>number of countries</i>	162 <i>179</i>	164 <i>179</i>	163 <i>179</i>	161 <i>177</i>	155 <i>178</i>	162 <i>178</i>	162 <i>178</i>
Global Competitiveness Index position of Ukraine <i>number of countries</i>	89 <i>139</i>	82 <i>139</i>	73 <i>144</i>	84 <i>148</i>	76 <i>144</i>	79 <i>140</i>	85 <i>138</i>
Corruption Perceptions Index position of Ukraine <i>number of countries</i>	134 <i>178</i>	152 <i>182</i>	144 <i>174</i>	144 <i>175</i>	142 <i>174</i>	130 <i>167</i>	131 <i>176</i>

Source: [1, 2, 3, 4]

The most prominent in 2010-2016 was progress in the area of business facilitation, as evidenced by an increase in Ukraine's place from 145 in 2010 to 80 in 2016 in Doing Business, at the same time, according to other indicators, no significant changes occurred during the period under review.

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DIE FINANZIELLE PLANUNG DER TÄTIGKEIT EINES UNTERNEHMENS

Eine besondere Rolle bei der effektiven Verwaltung des Unternehmens ist moderne Methode der Finanzverwaltung zu verwenden.

Moderne Methoden der Finanzverwaltung bestimmen sowie die konkreten Ziele und Aufgaben des Funktionierens eines Unternehmens, als auch die Mittel und die

Wege der Erreichung bei der Verwendung von benötigten Ressourcen um einen stabilen, nachhaltigen und sicheren Zustand dieses Unternehmens zu garantieren.

Die Finanzplanung ist eine der solchen Methode für die Finanzverwaltung.

Die Planung der Unternehmenstätigkeit wird durch zwei eng miteinander verbundene Aspekte gekennzeichnet. Der erste Aspekt ist allgemeinwirtschaftlicher Aspekt. Der zweite ist die Führungskompetenz als Funktion des Managements. Die Funktion des Managements besteht in der Fähigkeit die Tätigkeit des Unternehmens zu prognostizieren und diese Prognose für die Entwicklung zu benutzen.

Im Laufe der Finanzplanung beurteilt jedes Unternehmen gründlich seinen finanziellen Status, bestimmt die Möglichkeit der Erhöhung der finanziellen Ressourcen, identifiziert die Richtungen ihrer effektivsten Nutzung[4, c. 325-328].

Die Finanzplanung wird auf der Analyse von Informationen über die Finanzen eines Wirtschaftssubjekts, die aus den gesetzlichen, statistischen und Management-Reporting erhalten werden, verwirklicht.

Die Finanzplanung sorgt für die notwendige Kontrolle der Bildung und der Nutzung von materiellen, personellen und finanziellen Ressourcen. Sie beteiligt sich der Herbeiführung der makroökonomischen Stabilität und verbessert die Finanzbedingung eines Wirtschaftssubjekts. Die Finanzplanung versichert gegen niedrige Qualität der Finanzplanung, die Annahmen falscher Verwaltungsentscheidungen, die Verschwendung und ineffizienter Einsatz der finanziellen Ressourcen[2, C. 230].

Das Ziel der Finanzplanung ist ein Zusammenhang der Einkommen mit den notwendigen Ausgaben.

Der Prozess der Finanzplanung gibt die Möglichkeit, die Quellen, den Wert und die Richtung des Verbrauches von Finanzmitteln, die Bilanz der Ausgaben mit dem Einkommen, das Niveau der Knappheit von Ressourcen zu bestimmen. Dieser Prozess der Finanzplanung weicht den Ungleichgewichten aus[1, c.169].

Unter Finanzplanung versteht man das Management der Erstellung, Verteilung, Umverteilung und Verwendung von finanziellen Ressourcen, die durch die Wirtschaftssubjekte, die Staatorgane und die lokalen Selbstverwaltungen verwirklicht wird und wird auf verhältnismäßige und ausgewogene Entwicklung der Wirtschaft ausgerichtet.

Die Effizienz- und Genauigkeitsprobleme der Finanzplanung in einem Unternehmen werden nicht nur durch die externe als auch interne Faktoren beeinflusst.

Die externen Faktoren sind vom Unternehmen unabhängig. In einer instabilen wirtschaftlichen Situation, aufgrund der hohen Konkurrenz von Preisschwankungen können die Finanzziele erheblich von den tatsächlichen abweichen, und nämlich:

- das tatsächliche Einkommen vom Verkauf kann mehr niedriger sein. Es hängt vom Preis eines Produkts ab;
- die tatsächlichen Selbstkosten können die geplanten aufgrund der Verteuerung von Materialien und Komponenten übersteigen;

- die tatsächlichen Kommerzskosten können aufgrund steigender Preise auf Transportdienstleistungen, Brennstoffe und Verpackungsmaterialien übersteigen[3, c. 139].

Das wichtigste Problem der Organisation der Finanzplanung im Unternehmen ist das völlig fehlende der normativen Regelung. Ein Hauptbuchhalter konfrontiert oft mit den Vorgesetzten und Mitarbeitern anderer Abteilungen bei der Berechnung der Planzahlen. Zur Überwindung dieses Problems muss man die lokale normative Dokumente zur Regelung des Prozesses der Finanzplanung im Unternehmen, sowie die Aufgaben der Abteilungsleiter in diesem Prozess entwickelt werden.

Besondere Aufmerksamkeit für die effektive Finanzplanung im Unternehmen muss man dem System der Motivation der Arbeitnehmer widmen. Die Motivation ist sowohl Bestrafungen als auch Belohnungen.

Also unter Finanzplanung versteht man die Gesamtheit des Verfahrens, die das Volum und der Richtung des Verbrauches von Finanzmitteln zu bestimmen und steht nicht im Widerspruch zu den Zielen und Aufgaben, Dokumenten, Business-Plänen, geplanten Prognosen der sozioökonomischen Entwicklung.

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PRINT ADVERTISING AS IMPORTANT MEANS FOR PROVIDING COMPANY'S COMMUNICATIONS

In today's conditions of development, advertising plays an important role, specially such a type as printed advertising materials. The specificity of the print advertising is the essence of the possibilities of printing and printed products that

allows you to create a large variety of display for an object. With the help of printed materials, you can inform customers, clients, partners about discounts, congratulate on holidays, invite to the exhibition, acquaint with the existing range of goods or even just remind about your company.

The print advertising is the special information about an object, a product, a service, a firm, a legal entity or an individual. The print advertising is aimed at the visual perception of an information message by a target audience.

By the nature and combination of graphic means used in the print advertising, it is subdivided into textual (if it is dominated by the font), graphic (if the main element is the image), and complex (if it equally contains two components specified above).

Each of these varieties of the print advertising has its own specific characteristics, the totality of which determines the characteristics of the information presentation. In order to achieve maximum efficiency and not to be overlooked, the print advertising uses its own system of psychological influence. It should be emphasized that it is necessary to distinguish the print advertising from advertising in the press with such varieties as newspaper, magazine and reference. In both cases, the printing path of creation is used, but the features for the ways of presenting the information are completely different.

Thus, the print advertising is at the development stage in Ukraine, and each new year to create the advertising one uses new compositional techniques, which still need improving. To improve the print advertising it is necessary to take into account many factors, among which are the analysis of the target audience psychology, determining the scope and impact of advertising, the use of various compositional techniques. The print advertising should be as brief, concise and clear as possible, but at the same time, it should convey the main content of the message.

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ATTRACTION OF FOREIGN INVESTMENT TO UKRAINE: PROBLEMS AND SOLUTIONS

Foreign investment is extremely important in the process of national economy formation and development, Ukraine being no exception. Its own investment resources are largely lacking. Given the recent developments in the country – such as political and economic upheaval, military operations in the East and the annexation of the Crimea – investment activity in Ukraine has decreased. Foreign capital outflow from the Ukrainian market as well as many investment projects scaling down have also become the nowadays disappointing reality.

This paper aims at identifying current trends of foreign investment in the Ukrainian economy, the rate of Ukraine's investment attractiveness, and the major ways of solving the problems associated with foreign investment. The main research task is to assess the current state of foreign investment in Ukraine and analyze the main obstacles and problems Ukraine faces while making attempts to attract funds from foreign investors to the national economy.

One of the main problems in attracting foreign investments to Ukraine is low level of international business market infrastructure development coupled with imperfect legislation in the field of investment activity. To stimulate foreign investment activity in this country it is absolutely imperative to work out the investment policy with more specific and transparent mechanism of implementation at both local and state levels.

A number of other uncertainties and risks that are affecting the process of forming a favorable investment climate in Ukraine are as follows: the instability of current economic situation and the problems of legislation in the economic field; insufficiency and inaccuracy of information provided about the state of investment objects; industrial and technical risks; foreign economic risks; uncertainty of interests, behavioral patterns and purposes of investment processes participants; fluctuations in market infrastructure, exchange rates and prices.

The events in the country from 2013 to 2014 have had a dramatically negative impact on the economic situation in Ukraine and significantly changed the direction of foreign economic activity in the country. The deterioration of Ukraine's balance of payments happened due to deployment of an armed conflict in the East, as well as the closure of the Russian market. Since the beginning of 2014, the Ukrainian economy has lost \$16048,5 m of investment. At that time, the capital inflow into the domestic economy stood at only \$1501,0 m. As of December 31, 2016, the total volume of

foreign direct investment (share capital) into the national economy of Ukraine amounted to \$37655,5 m , the per capita figure amounting to \$884,3 only [2].

Despite the insufficient amount of foreign investment in the Ukrainian economy, according to a survey conducted by the European Business Association (EBA), over the past six years Ukraine's investment attractiveness index has reached its historic high. So, as of 2017, the value of this indicator was 3.15 points (on a 5-point scale). Compared to last year's figures (2.88 and 2.85 points in June and December, respectively), this is not a bad result, although not high. It should be noted that the last time when index value exceeded the mark of 3 points was at the end of 2011 [3].

Analysis of the tendencies of attracting foreign investments to Ukraine, starting from 2007, shows that their volume still remains insignificant (see Table 1) [2].

Table 1
The aggregate capital of non-residents in Ukraine during the period of 2007-2017 (as of January 1st)

Years	Total capital of non-residents, \$ mln.	Growth rate up to the previous year, %	Growth rates up to 2007, times
2007	21607,3	-	-
2008	29542,7	136,7	1,4
2009	35616,4	120,6	1,6
2010	38992,9	109,5	1,8
2011	45370,0	116,4	2,1
2012	48197,6	106,2	2,2
2013	51705,3	107,3	2,4
2014	53704,0	103,9	2,5
2015	40725,4	75,8	1,9
2016	36154,5	88,8	1,7
2017	37325,0	103,2	1,7

As of January 1, 2017, the volume of investments attracted since the start of foreign direct investment in the economy of Ukraine amounted to \$37325,0 m with the per capita indicator standing at \$876,5. In 2016, foreign investors invested \$36154,5 m of direct investment in the national economy of Ukraine. The amount of capital increase for this period stands at \$170,5 m.

In general, Ukraine has a number of problems that hinder effective attraction of foreign investment. These problems include the factors listed below:

- instability of the tax policy: significant number and high level of taxation deprives the country of competitive advantages in the process of attracting foreign investment;
- political instability: under the conditions of constant political changes, the foreign investor will feel rather uncertain. Moreover, he will not know what kind of policy will be implemented by the new government. Besides, the “weak” national economy is not always able to offer high and fast earnings to hedge the investment risks;
- imperfect legislation, which manifests itself in insufficient legal protection, in the long procedures for registration and obtaining necessary certificates, in the absence

of effective mechanism of legal protection of foreign investors from illicit partners and debtors. It was these conditions that resulted in many powerful foreign companies leaving the Ukrainian market;

- absence of system for assessing the investment climate in the country and its individual regions;
- customs barriers: misunderstanding with customs authorities in determining the method of charging excise taxes, customs duties and customs value of goods, as well as several days delivery delays and high rates of import duties when foreign investments inflow to Ukraine. All this makes supplies to Ukraine much less attractive in the eyes of foreign investors;
- undeveloped market infrastructure of international business in Ukraine: one of the factors that limits the increase of foreign capital inflows is lack of proficient consultants, auditors and experts;
- high inflation rate in Ukraine;
- unreliable banking system: domestic banks have lost the trust of western businessmen, as well as the confidence of the Ukrainian population;
- absence of effective insurance system: nowadays mechanisms of state insurance of foreign capital in Ukraine are insufficiently developed [1, c. 22-28].

In order to facilitate effective development of Ukrainian economy, it is necessary to attract as much foreign capital as possible, which will, in particular, provide an opportunity to increase the number of jobs and stimulate an increase in production volumes. That is why, in order to improve the investment climate in Ukraine and enhance foreign investment processes it is necessary to introduce the following practices:

- to reform the taxation system: it is necessary to create the system that would guarantee sufficient revenues to the budgets of all levels and create favorable conditions for further integration of Ukraine into the world economy;
- to stabilize the banking system by carrying out a whole range of various activities, such as: creating an effective and transparent legal and regulatory framework for investment activity in the country; working out an effective and flexible NBU policy guarantee appropriate control over banks activities and minimize other entities interference with these activities;
- to ensure improvement of the work of insurance companies: it is necessary to create a national insurance company that would be engaged in underwriting risks of not only domestic but also foreign investors;
- to achieve national agreement between political parties and various social groups on solving national problems of Ukraine's exit from the economic crisis and political instability;
- to develop a special program for the development of free economic zones on the territory of Ukraine, mainly in the form of free customs zones of export production;
- to create institutions that would be involved in mobilizing investment resources for specific, effective investment projects and programs in the most priority sectors of the national economy [4, c. 59–65].

Thus, the state should identify priority sectors of the economy. In today's Ukraine, the list of these sectors seems to include the field of high technologies, the agrarian sector, the machine building industry, the IT industry, the energy and oil and gas industry. Development and effective implementation of a transparent strategy of attracting foreign investments in these spheres will contribute to further recovery in other sectors.

In conclusion, it's worth highlighting that introduction of the above ways to increase the level of investment attractiveness of Ukraine will lead to the inflow of foreign investment and, as a result, facilitate successful development of Ukraine's national economy.

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PROBLEMS AND PERSPECTIVES OF ECOTOURISM

Problems of ecotourism

Ecotourism is barely regulated and a lot of industries actually harm the environment by introducing too many people to sensitive areas e.g. coral reef.

- Ecotourism programs are easily mishandled. Environmental conservation and restoration is a nuanced science that is very difficult to replicate and explain in laymen's terms. In the wrong hands, people and not-for-profits can actually do a lot of social and environmental harm.

- Touching on the last topic again, ecotourism can only be successful if programs are carefully designed to both a) be sensitive to the natural environment and b) provide a direct economic benefit to native locals rather than multinational tourism companies (which provide very little financial independence for families of workers).

[1, p.2]

People and ecotourism

The important issue is, whether the nature can withstand outside visitors. There are far too many examples of the over-exploitation of wildlife by people who call themselves ecotourists. Erosion of the ground easily destroys the values, by which the tourists have chosen the destination. This happens in habitats, where the number of visitors exceeds the natural carrying capacity of soils or vegetation, and also where reckless visitors pollute the nature with waste. The hiking trails can be strengthened to sustain masses of visitors – although some of the “pristine virginity” of the wilderness is lost. Similarly, many tour organizers believe – or at least they are trying to convince the customers – that the fauna and flora can also be “hardened” to withstand the ever-increasing number of people viewing and photographing them.

To reach and maintain sustainability in tourism destinations, appropriate behavior of the visitors is a vital prerequisite. National parks and other protected areas are often considered as habitats established to wildlife conservation. These sites are, however, also destinations for masses, and several intentions and expectations have to be considered. Visitors’ preferences and wishes largely determine, whether or not the destination fulfils pre-established expectations. Knowing the hopes and motives of visitors is thus vital in managing both the sites’ infrastructure and the subject matter of organized nature tours/excursions. [2. p.3]

Possible solutions?

Obey the regulations of the ecotourism organization exactly.

Research the local wildlife in order to know all possible sustainability threats to reduce the negative impacts of your excursions.

Refrain from overeating or wasting water whenever possible. Take what you need.

Travel impacts on the environment: In order to visit some of these exotic places, you have to travel long distances. Planes generate a huge amount of global pollution which can indirectly affect the local ecosystems of your travel destination. Cars and boats used for local transportation will have more direct negative effects, which can also lead to environmental degradation.

Possible solutions?

Consider taking a nonstop flight. Although this might be more expensive, it uses less fuel than regular flight plans.

Walk or take public transportation while traveling in a country. Try renting non-motorized boats or vehicles if the need arises.

In some places, guided tours are offered via horses, camels, elephants, or other native animals rather than by Jeep or bus. Not only is this an incredible experience to witness amazing wildlife, it reduces the impact of your carbon footprint, literally!

Integrity of ecotourism organization: Ecotourism has grown in global demand by about 25% each year. Many organizations are jumping on this trend, claiming their parks and programs are “ecotouristic” despite their negligence to adhere to eco-friendly policies. Unfortunately, ecotourism has turned into a marketing ploy to entice tourists to spend their money on the organization's service

Pros of ecotourism

Valuable biological Information: Ecotourism provides the opportunity for not only environmentalists, but also tourists to learn more about the ecosystems, biology,

and geology of a specific location. Knowing the components of an ecosystem can lead to a better understanding of how to conserve different species and natural formations. Ecotourism provides an impactful firsthand experience about sustainable living and eco-friendly practices.

Local economic improvement: In some cases, ecotourism provides sustainable economic growth for countries. Places like Ecuador, Nepal, Madagascar, and Costa Rica rely on tourists to build their economies. Regular travel and tourism usually returns only about 20% of revenue back to local communities while ecotourism can return as much as 95%. Ecotourism isn't only about conserving environments; it's also about sustaining communities. [3, p.2]

For example, Madagascar's government has started promoting its tourism as an economic strategy to shrink its 81% poverty rate. Although it's still in the idea phase, it's possible that ecotourism could be the answer to their unemployment crisis.

Positive impact on community culture: Not only does ecotourism create jobs for locals, it also promotes and preserves traditional practices. Locally grown food and crafted goods creates a direct economic and cultural connection between the tourist and citizen. Ecotourism promotes these cultural traditions rather than altering native customs to fit specific international norms. Some consider ecotourism to be a means to end cultural ignorance, stereotyping, and fear in the world through its ability to educate travelers.

Increased environmental awareness: Most ecotourism programs include educational components about environment preservation. The tourists can help spread environmental awareness by taking the information they've learned and apply it to their daily lives.

Financial benefits toward conservation: When people spend money on ecotourism, some of it goes toward conservation efforts like reforestation and endangered species repopulation projects. Essentially, the more money spent on ecotourism, the easier it will be to finance conservation projects.

In conclusion, I suggest a perspective through a last example, in France. The "Oysters road in Charente" seeks to reconcile tourism, environment and human activity. The particularity of this tourism offer is that it is not just a consumer product. This is the result of a project approach, involving public authorities and private economic actors to share and live their territory. And it works well! Through this example, we can finally ask if ecotourism is the goal. Is it not rather the result of a contractual approach around a project area? Is not the real issue in the search for shared governance? The future is open.

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PROVIDING SECURITY OF ACCOUNTING INFORMATION IN THE CONDITIONS OF HYBRID WAR

In today's economic conditions, accounting information is becoming one of the most important factors in the development of the economy, it is the product of mutual exchange between different participants in economic processes. Ensuring the proper level of economic security of an enterprise is one of the functions of the accounting system.

Accounting systems contain confidential information that should be kept safe and secure at all times. The consequences of unauthorized access can be devastating – from identity theft problems to loss of irreplaceable data.

The system of information security, and accounting, in particular, is a set of technical tools, technologies, methods, organizational measures that prevent unauthorized (illegal) access to information contained in accounting documents.

In the conditions of the hybrid war for domestic enterprises, the priority task is to achieve an adequate level of economic security that would ensure the possibility of their further activities.

The information security system should be multilevel with hierarchical access to information, specified and tied to the specifics of the enterprise regarding methods and means of protection, open to constant updating, reliable in both normal and extreme situations, should not create the employees of the enterprise inconveniences in work. Complexity of the system of protection is achieved by its formation from various elements – legal, technical, program and organizational. The ratio of elements and their content ensures the individuality of the enterprise information security system and guarantees its reliability.

Thus, in the conditions of the hybrid war for domestic enterprises it is of a great concern to provide, firstly, physical security. A small business should safeguard its computer systems against losses and theft.

Secondly, enterprises should pay special attention to authentication. All systems should have login IDs and passwords that authenticate the user, confirming that he is allowed to use the computer.

Thirdly, accounting system should be protected from viruses. This issue is of a great concern due to the conditions of the hybrid war in Ukraine. As political and military aims are achieved skillfully by combining military operations with cyber-attacks. A virus attack can bring an entire accounting system down, making it unusable and ineffective. Sometimes certain viruses can disrupt a system so severely that it may need to be wiped out or replaced completely.

Also it should be mentioned that backup as well as considerations are also very important. A standard security procedure with accounting systems is to back up data and save the backup in a safe place outside the premises. The point is that if something happens to the system, such as fires, floods or other losses, data is safe and can be restored. When system needs to be fixed, some files and confidential information may be opened to those who repair the system. When a computer system used for accounting is sold or given to another party, it may still contain confidential information in its hard drive. So system should be cleaned up by a professional before donating or selling it.

Accounting information is a key factor in ensuring the company's economic security. Protection of accounting information is a condition for an objective reflection of the reality of the entity, which will facilitate timely detection of internal and external threats and possible calculations of alternative solutions for their elimination or prevention. Therefore, the issue of protection of accounting information in the conditions of hybrid war, in particular, is of a great concern.

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CHALLENGES OF PREPARING AN INTEGRATED REPORT

In recent years, the call for companies to account for their activities to a wide group of stakeholders has grown. It is now widely accepted that traditional financial reporting no longer meets the needs of businesses seeking to develop and maintain resilient and responsible transactions, not just in the immediate future but also in the medium and long term.

Financial statements draw on historical information and are therefore backward looking. They also focus heavily on financial capital, whereas success for many organisations today depends on other resources – such as the expertise of their people, their intellectual property developed through research and development, and their interaction with the environment and the societies in which they operate. Integrated reporting was developed to fill such reporting gaps.

Integrated reporting provides a platform for such stakeholder communication. Recent studies have, however, concluded that integrated reporting is viewed merely as an exercise to be undertaken to ensure compliance.

Since the release of the International Framework in December 2013, the pace and scale of adoption by organisations has steadily increased. From 2018, the IIRC plans that will enter its “Global Adoption Phase” are firmly at the centre of corporate governance and corporate reporting.

In the result of analysis of scientific works concerning peculiarities of preparing integrated report benefits from adopting Integrated Reporting have been identified. They are as follows: more integrated thinking and management; greater clarity on business issues and performance; improved corporate reputation and stakeholder relationships; more efficient reporting; employee engagement; improved gross margins.

In our research we will explore the challenges faced by those charged with the preparation of the integrated report.

As the result of our research we identified several common areas of weakness while preparing integrated report: value creation – particularly in relation to business models, capitals and the concept of connectivity; connectivity – showing a holistic picture of factors that affect value creation over time; materiality – determining and applying from the perspective of value creation; conciseness – keeping page numbers down; reliability and completeness – balancing good and bad news; consistency and comparability – allowing comparisons to be made over time and with other organisations.

Describing company's business model in relation to the Framework is the hardest aspect of to implement, because of the Framework's capitals-based approach.

The connectivity challenge stems in part from how its approach to has developed over time. Connectivity is more than producing a report and drawing lines between things; it's how you build that understanding within each level of the business.

One more challenge is reconciling the needs of different stakeholders when determining materiality – in particular, one issue may be more material to one stakeholder than another; applying the definitions of materiality in the Framework and other standards/ frameworks, in order to meet reporting requirements efficiently and effectively – and without confusing readers. One of the key challenges for integrated reporters when applying the materiality filter centres on identifying the organisation's key stakeholders.

Conciseness is also a challenge when reporters want to include new information, either to meet regulatory requirements or because additional content could be helpful to readers. Many reporters find conciseness difficult as they try to provide sufficient context to help readers understand the organisation's value-creation process and performance.

Achieving reliability and completeness is important for a report's credibility in the eyes of investors and other stakeholders. Financial information must be reported in accordance with generally accepted accounting standards, and for larger entities is generally audited in accordance with international auditing standards. Companies are aware that the non-financial, or pre-financial, information they include in an integrated report should be subject to similar levels of rigour if investors are to see it as useful. However, non-financial reporting is not yet mature. There remains a lack of coherence among the many non-financial reporting frameworks and standards that exist, and the widely recognised mechanisms that provide assurance over financial information are

yet to emerge in non-financial reporting.

The information in an integrated report should be presented: on a basis that is consistent over time as well as in a way that enables comparison with other organisations to the extent it is material to the organisation's own ability to create value over time. The problem is that investors like to see comparative information going back over perhaps 10 years. Providing meaningful information over such a long period can be challenging.

Taking into consideration challenges determined during performed analysis the suggestions on solving them while preparing an integrated report will be prospects for our further research.

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MACROECONOMIC INDICATORS IN THE SYSTEM OF NATIONAL ACCOUNTS

The urgency of the topic of the study is that knowledge of the functioning and methods of calculating the main macroeconomic indicators makes it possible to navigate in those economic processes that occur at the level of the national economy, to understand the meaning of the events that occur, especially the government's actions in the field of economic policy, to evaluate possible prospects and make decisions in accordance with this assessment.

Macroeconomy is one of the sciences that studies the economy. In addition to macroeconomics, it is taught in many other economics: political economy, microeconomics, marketing, industry and functional economics, etc. Macroeconomy as a science relies primarily on the positions and conclusions of the economic theory of the development of industrial relations, extended reproduction, the effect of objective economic laws and the mechanism of their application in the practice of management. It is also directly related to mathematics and statistics, widely uses methods of economics and mathematical modeling, which transforms it into exact science. Allows you to move from quantitative to qualitative analysis of economic processes and phenomena. Macroeconomics forms scientific ideas about the functioning of the economy at the national level. Analyzing the main factors and consequences of macroeconomic development, this science at the same time offers certain "recipes", methods of active influence on the object of his research, that is, on the process in the practice of management.

For the analysis of economic phenomena and processes, complex economic interconnections, a system of reliable interdependent indicators is required. In economic theory and in economic practice, different forms of measuring the social

product are used. Variety of forms and methods of measuring the results of national economic activity is determined by different theoretical approaches to the characteristics of social production, different methods of statistical calculations, different stages of the movement of a social product in the process of economic circulation. [3, pp75-79]

The central place among international accounting and statistics systems belongs to the National Accounts System (SNA). SNA is the most important modern international standard in the field of national accounting. They are used by the statistical authorities of most countries of the world. SNA now in countries with market economics is an important component of economic statistics. After independence, Ukraine began to move from the former Soviet balance of the national economy to the SNA. Nowadays, the State Statistics Committee of Ukraine develops and publishes only national accounts. So work on this topic is relevant.

The general indicators of the functioning of the national economy for a certain period form the system of national accounts (SNA). This is a system of interrelated indicators and classifications used to describe and analyze general outcomes and aspects of macroeconomic development. SNA is formulated by categories and terms of a market economy. Concepts and definitions of this system suggest that the economy, described with its help, functions on the basis of market mechanisms and institutions. [1, pp140-146]

In the planned economy, the system of balance of the national economy (SBGN) prevailed. It was based on the Marxist methodology of calculating indicators and was of a costly nature. A characteristic feature of the system was the division of social production into two unequal areas: material production and intangible production.

According to this concept, the gross social product, the pure social product, the final public product, national income as the main macroeconomic indicators of the SBGS was created only in the industrial sphere. At the same time, the product produced by the intangible industries of the economy, not the Soviet statistics reflected the low level of economic development, the underdeveloped sphere of services, as well as the fact that the priority of economic policy was proclaimed the development of material production.

The balance of the national economy for 1923-1924, developed by the USSR CSU under the leadership of P. I. Popov and published in 1926, was recognized as one of the world's first official calculations of macroeconomic indicators. Only in a quarter century, similar macroeconomic developments appeared in countries such as the United States, England, Holland, and others. However, these calculations were already carried out in the form of a system of national accounts (SNA), which was formed on the basis of improving the methodology of the development of the SBGS.

The economic territory of a country is an area that is administrated administratively by the government of this country, within which persons, goods, and money can move freely. Unlike geographic territory, it does not include embassies, military bases, etc., but contains similar objects located in other countries.

In general, individuals or legal entities are considered to be residents of the economy with which they are connected more closely than with any other or the one that contains the center of their interests:

- for enterprises (firms) - in the territory of the country where they carry out their activities;
- For individuals - residents who are working and residing in the country are residents
- for individuals - residents who are working and residing in the country for one year or more regardless of their nationality and nationality;
- Public administration bodies are residents of their own country, even when dealing with activities carried out abroad, for example, embassies of foreign states and citizens of the same country, working from them, are residents of their economy.

Depreciation deductions - the cost of fixed capital, which is going to compensate for depreciated funds. [2, pp.123-125]

Net investments - funds for the purchase of additional items of fixed capital. This indicator characterizes the net increase in the volume of accumulated capital, is an indicator of the state of the economy of the country (for a growing economy $/ > A$; if the economy is in a state of recession, then $/ < A$).

For these adjustments, price indices (price deflators) of Laspeyres, Paasche and Fisher are used.

The Laspeyres index is an aggregate price index, which shows how prices change over two comparable periods, provided that the structure of the produced GDP remains unchanged.

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$$I_L = \frac{\sum_{i=1}^n P_t^1 \cdot Q_i^0}{\sum_{i=1}^n P_t^0 \cdot Q_i^0}$$

The Paasche index - partly compensates for the limitations of the Laspeyres index, because the weights in this case are the commodity structure of the production of the current period.

$$I_p = \frac{\sum_{i=1}^n P_i^1 \cdot Q_i^1}{\sum_{i=1}^n P_i^0 \cdot Q_i^1}$$

Consequently, the Paasche index, calculated for the aggregate of goods and services that are part of GDP, is called the deflator of GDP.

Fisher's index is the geometric mean of the Laspeyres and Paasche indexes, which eliminates their limitations:

$$I_f = \sqrt{I_L \cdot I_p}$$

Along with the price index, the index of the physical (real) volume of production is calculated:

$$I_k = \frac{\sum_{i=1}^n P_i^0 \cdot Q_i^1}{\sum_{i=1}^n P_i^0 \cdot Q_i^0}$$

Conclusion

Having studied the above topics, we can draw the following conclusions.

Today, Ukraine faces the challenge - to move from the command-administrative to the mixed market economy. This is due to many fundamental changes in society - the change of ownership, the transition to a multi-faceted economy, the creation of a competitive environment, an appropriate structure and market infrastructure, the emergence of part-time employment, etc.

The path of Ukraine to a market economy lies in the transition economy with the peculiarities of the gradual dying (static) system and the peculiarities of a mixed economy, which will be manifested more and more reliably. But a rather long period of time (several years) will take place before an economical transition system type that requires significant restructuring and, in this respect, unbalanced, is transformed into an regulated market system. The transitional economy exists today in most countries of the world - the countries of the former socialist system that have become transitional markets, countries with underdeveloped economies in Asia, Africa and LatinAmerica.

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NATIONAL DEBT AND MANAGEMENT

The urgency of the topic of national debt is explained by the fact that debt is an important element of the "income-spending" cycle.

Public debt distorts the economy, slows down the development of real economic processes, and ultimately prevents the country from efficient developing. A big burden lies on the state budget. It is constantly in crisis, which deepens more and more. And this leads to the growing of the national debt.

Public debt is the cumulative total of all government borrowings less repayments that are denominated in a country's home currency [2].

The economic essence of public debt revealed through the following two functions:

1. fiscal – involving state funds needed to finance budgetary expenditure;
2. regulatory – adjusting the money supply through the purchase and sale of securities by the central bank of the country [1, c. 455].

The state debt of Ukraine includes:

1. arrears on loans from international organizations, economic entities;
2. debt on loans from foreign authorities;
3. arrears on loans from foreign commercial banks;
4. external debt not attributed to the other categories.

Payments for servicing public debt are carried out by the State Treasury of Ukraine in national and foreign currencies in the following order:

- payment for the use of a loan (payment of interest income on debt) and commission payment, fines are paid directly to the accounts of creditors or agent banks in accordance with agreements agreed to by the Ministry of Finance of Ukraine with creditors and bank agents as in national and foreign currencies. Transactions in foreign currency are made from foreign currency accounts of the State Treasury Service of Ukraine;

- other payments for servicing the public debt are made in the national currency through the registration accounts opened in the name of the Ministry of Finance of Ukraine in the State Treasury of Ukraine; in foreign currency - from the foreign currency accounts of the State Treasury of Ukraine to the accounts of service providers according to the supporting documents.

According to Articles 59, 60, 61 of the Budget Code of Ukraine, the State Treasury of Ukraine prepares:

- a report on the public debt and government's guarantees;
- a report on arrears of economic entities to the state for loans borrowed under state guarantees;

- statement on payments made by the state of the guaranteed obligations;
- information on public debt management;
- information about provided state guarantees. [4]

The total amount of public debt and state-guaranteed debt at the end of the budget period cannot exceed 60% of the annual nominal Ukraine's GDP.

In case of expected exceeding of this limit, the Cabinet of Ministers of Ukraine will immediately address the Verkhovna Rada of Ukraine for permission to exceed this limit temporarily and submit for approval the plan of measures for bringing the total amount of public debt and guaranteed state debt to the established requirements. [3]

In 2016 public debt exceeded 75 billion dollars, has increased 3,660 million since 2015. This amount means that the debt in 2016 reached 81.25% of Ukraine GDP, a 1.92 percentage point rise from 2015, when it was 79.33% of GDP. [6]

According to the data point published, Ukraine per capita debt in 2016 was 1,787 dollars per inhabitant. In 2015 it was 1,694 dollars, afterwards rising by 93 dollars.

The position of Ukraine, as compared with the rest of the world, has worsened in 2016 in terms of GDP percentage. Currently country number 154 in the list of debt to GDP and 81 in debt per capita, out of the 185 published.

At the same time, the direct external debt increased by \$150 million - up from \$37.24 billion a month, while the direct domestic debt declined to UAH 678.88 billion. [5]

In order to manage the national debt effectively, the Ministry of Finance of Ukraine has the right to carry out such operations as issue, purchase, redeem and sell governmental debt bonds, subject to compliance with the limit of the state and local debt at the end of the budget year. [3]

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SOCIALLY RESPONSIBLE MEASURES OF THE COMPANY INTENDED TO PROVIDE SOCIAL AND ECONOMIC ASSISTANCE FOR MILITARY MEN FROM THE AREA OF MILITARY CONFLICTS

There is a military conflict during last three years in Ukraine, where hundreds of thousands of Ukrainians has already taken part. Thus, issues of social and economic protection of military men from the area of military conflicts and their families became especially important due to the current military and political situation in the state. Individuals carrying out honorary missions of the defender of the state should feel confident that they and their families will be protected by the state. Insufficient level of social and economic protection of military men, as evidenced by foreign and domestic experience, negatively affects the qualitative composition of army, reduces motivation, gives rise to dissatisfaction and can lead to negative consequences.

The problem of social and economic protection of military men from the area of military conflicts in the complex of rights and guarantees provided by the legislation of Ukraine for such categories of people has not currently been investigated. Some issues on this topic have been considered in the works of Ukrainian scientists [1, 3].

The purpose of the study is to conduct an analysis of the measures aimed at providing social and economic assistance to military men from the area of military conflicts that are carried out by enterprises and giving suggestions for their accounting reflection.

State regulation of social and economic protection of military men from the area of military conflicts is to establish a system of satisfaction of certain social and economic needs, in particular regarding psychological support, material assistance, sanatorium treatment, education guarantees, prosthetics in the event of loss of functional properties of the limbs, provision of motor vehicles, privileges in the payment of certain types of services, pensions, housing or land, labor rights, in particular saving the place of work and average earnings while participating in the ATO, etc. However, in practice, these guarantees are often violated.

The Law of Ukraine “On Defense of Ukraine” [2] states the provisions on the social and economic protection of military men from the area of military conflicts, including:

1) The Cabinet of Ministers of Ukraine ensures the implementation of the right to social and economic protection of military men as well as retired or resigned men, members of their families, as well as members of families of military men who died, disappeared, have become disabled during military service or have been captured during hostilities (war) or during international peacekeeping operations;

2) The Ministry of Defense of Ukraine implements measures aimed at the implementation of social and economic and legal guarantees to military men, members

of their families and employees of the Armed Forces of Ukraine, retired or resigned men as well as to members of families of military men who died, disappeared, have become disabled during military service or have been captured during hostilities (war) or during international peacekeeping operations;

3) Ministries and other central executive authorities, in co-operation with the Ministry of Defense of Ukraine, within the framework of their authority, ensure the implementation of legislation on the social and economic protection of Ukrainian citizens in connection with military service.

The Law does not provide the interpretation of the term “social and economic protection” or at least an explanation of the list of measures that may be included in this concept. Analysis of state policy indicates that it is characterized by unsystematic and fragmentary measures, limited tools for conducting fundamental changes, ignoring objective factors.

Social and economic protection of military men from the area of military conflicts is a local, although very important, problem of the defense system of Ukraine.

As a result of the analysis, it has been established that one way of solving the issues of social and economic protection of military men from the area of military conflicts can be conducted through social responsibility of enterprises, which is possible in the following way: 1) professional adaptation of military men from the area of military conflicts, in particular regarding granting of additional guarantees regarding employment, retraining, advanced training; 2) the development of an effective mechanism for solving housing problems of military men from the area of military conflicts.

The direction of our further research will be the analysis of international experience on the mentioned problem in order to present suggestions for improving accounting reflection of measures aimed at providing social and economic assistance to military men from the area of military conflicts that are carried out by enterprises.

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Session work №4

CURRENT RESEARCH IN THE FIELD OF HUMANITIES

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USING THE HALLOTALK LANGUAGE EXCHANGE APP BY THE MILITARY STUDENTS DURING THE INDEPENDENT WORK

The growth of technology for educational use has transformed the way in which students learn and access education. Application software for computers or mobile devices can do a lot of things for military students during their independent work. Apps can help them get better organized, study for tests and prepare research papers. In other words, they can help them do their very best work.

The benefits of using apps during studying are as follows: 1) help keep students engaged; 2) add a new dimension to learning; 3) easily accessible.

Technology is always an exciting addition to any classroom. Students typically love working with technology and prefer it over reading and writing in a traditional way. Using apps in the classroom and after classes is one great way to spice up the students' learning and help keep them engaged in the material.

Using apps adds a whole new dimension to students' learning. It's not news that repetition and review are essential to the success of learning a language. Apps reinforce the material and allow students to experience English in yet another form.

With the easy accessibility of apps, they can be used both inside and outside of the classroom. Apps are so easy to use for both students and teachers, and require absolutely no prep time.

The HalloTalk language exchange app is one of the best apps to learn a language. It has long been known that the best way to learn languages is through conversation and this is exactly the app's fundamental assumption. Within the community HalloTalk students can talk to people from all over the world and improve their skills through direct contact with native speakers. Thanks to the automatic translation service they can communicate in a foreign language and practice conversations on various topics.

The exchange of text messages helps to learn new colloquial phrases and idioms used in everyday language.

HelloTalk offers a huge list of languages and is the next free application that can be downloaded from the App Store and Google Play. The only thing students need is internet connection to make free calls, meet and chat with people from around the world and learn another language. You can chat with individual members, or join group chats for a collaborative learning experience.

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LOWERING THE AFFECTIVE FILTER FOR ENGLISH LANGUAGE LEARNERS AS A WAY TO FACILITATE SUCCESSFUL LANGUAGE ACQUISITION

The "affective filter" is a theoretical construct in second language acquisition that attempts to explain the emotional variables associated with the success or failure of acquiring a second language. The affective filter is an invisible psychological filter that can either facilitate or hinder language production in a second language. Optimal input occurs when the affective filter is low.

To reduce the affective filter in English learners, it is necessary: 1) to modify teaching materials and styles, 2) imply appropriate error correction and 3) use positive tone and body language. In other words, it is important to create a supportive learning environment that helps learners feel as comfortable as possible.

In order to reach every learner, a teacher must explore all of the styles and the methods associated with each. It is his responsibility to know his students' preferred styles and develop engaging lessons suited to them as individuals. It is always important to include visuals and realia. Providing visual and tangible examples of the topic at hand is one of the best ways to teach, not just students, but anybody who is trying to learn something.

There are many considerations to be made when determining what to correct and how to correct it. If someone corrected every word that came out of your mouth, you'd eventually stop talking. The purpose of the affective filter is to allow students to make mistakes without fear of being corrected. A teacher must convince students that in his

classroom making mistakes and learning from them is considered a positive and productive experience.

By using positive tone and body language a teacher can provide the environment in which students feel most at ease. Learners don't always understand teacher's words, but learners do always understand his tone. Not only can teacher's attitude be heard in his voice, it can be seen in his eyes and shown with his body language. It should be the goal of the educator to provide an environment which facilitates the lowest levels of the affective filter.

When the affective filter is low, the learner is in an emotionally safe place. These feelings of safety lower imaginary walls, promoting more successful language acquisition. This type of environment becomes a welcoming invitation to keep learning.

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THE WORLD OF ANIMALS IN ENGLISH AND UKRAINIAN PROVERBS AND SAYINGS

A central issue in this article is the use of proverbs and sayings about animals in the English and Ukrainian language in the kindergarten. Proverbs and sayings about animals help the child to develop, learn something new, to get the best features of human character. Therefore, our attention will be focused on the idioms which reflect the culture of the English or Ukrainian language.

This question is explored by such scholars as V. V. Vinogradov, L. A. Bulakhovsky, V. L. Arkhangelsky, V. M. Mokienko and others. However, little research has been undertaken to study the problem of learning English proverbs at the kindergarten.

If you compare the proverbs and sayings in English about animals and the proverbs in Ukrainian language about animals, they are significantly different in translation and classification.

Consider the classification of the English proverbs and sayings about animals:

I. Proverbs denoting the moral qualities of a person:

▪ It is ill to waken sleeping dogs. / Let sleeping dogs lie. – Не слід будити сплячих собак. / Не буди лихо, поки воно спить.

▪ To beard the lion in his den. – Нападати на лева в його власному лігві (тобто хоробро виступити проти досвідченого і небезпечного противника).

II. Proverbs meaning existence:

▪ A curst cow has short horns. – У проклятої корови роги короткі. / Битливій корові бог ріг не дає.

▪ A fly in the ointment. – Муха в бальзамі. / Ложка дьогтю в бочці меду.

III. Proverbs that mean the social sphere:

▪ Birds of a feather flock together. – Птахи одного оперення збираються разом. / Масть до масті підбирається. / Рибак рибака бачить здалеку

IV. Proverbs that mean appearance:

▪ That is a horse of another colour. – Цей кінь іншої масті. / Це зовсім інша справа.

▪ As black as a crow. – Чорний, як ворон.

▪ Black hen lays a white egg. – Чорна курка несе біле яєчко. / Від чорної курочки та біле яєчко.

V. Proverbs which mean the emotional-mental state:

▪ As merry as a cricket. – Веселий, немов цвіркун (тобто життєрадісний)

▪ He that loves the tree, loves the branch. / Love me, love my dog. – Хто любить дерево, той любить і кожну його гілочку. / (Якщо) любиш мене, люби й мою собаку.

VI. Proverbs which mean work activity:

▪ As busy as a bee. - занять (працьовитий), як бджола.

▪ A cat in gloves catches no mice. – Кішка в рукавичках мишей не ловить. / Без труда нема плода.

▪ The early bird catches the worm. / If you want to achieve something, you need to work hard and not be lazy. – Рання пташка ловить всіх черв'яків.

VII. Proverbs that mean behaviour:

▪ Each stain comes to sight on a horse that is white. – На білому коні видно буде плямочку. / Кому багато дано, з того багато і спитається.

Considering all this classification, we came to the conclusion that proverbs and sayings about animals are extremely interesting both in Ukrainian and in English.

Despite the importance of classification of proverbs, little attention has been paid to using this proverbs at the kindergarten, how to teach a child of preschool age these proverbs and sayings. This question is important for every kindergarten educator. Today there are a number of methods of teaching children the English proverbs and sayings about animals.

In order to teach the child a proverb about animals the educator have to:

1) Teach children the words used in proverbs;

For example: domestic animals and birds: cat (кіт), dog (собака), horse (кінь), mule (мул), ox (віл), bull (бик), cow (корова), calf (теля), pig (свиня), ass (осел),

cock (півень), hen (курка), chicken (курча), goose (гусак, гуска), gosling (гусеня), sheep (вівця), lamb (ягня).

2) Repeat the learned words several times. Check knowledge in the oral form.

3) Memorize the most commonly used proverbs and sayings, containing animal names on the proposed topics, for example, proverbs characterize "the Moral Qualities of Man," "Life Experience", "Labour".

4) Consolidate the knowledge. It is certain to be developed with didactic games and with pictures that can help the child to remember certain proverbs, for example, the proverb «Never buy a pig in a poke. - Не купуй kota в мішку» can be repeated some times. When the children have already memorized this proverb, give them images that would be associated with the proverb. For example, the cat in the bag. Then give the task: "find the picture that best fits this proverb".

5) Educator can involve the parents to develop the English language atmosphere. That is why, homework can be assigned in separate envelopes for parents and children.

This paper focuses on a comparison of proverbs and sayings about animals in the English and Ukrainian languages. The results have shown that the proverbs and sayings about animals in Ukraine and in England have some similarities and some differences. They differ in translation and the different interpretation. Despite this, proverbs and sayings about animals have a positive influence on child's development. In addition to this, the English proverbs help children to learn a new language and understand foreign people.

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THE PECULIARITIES OF PROFESSIONAL TRAINING OF BACHELORS IN CYBERSECURITY: AMERICAN MODEL

The aim of this paper is to determine the course of research and to highlight its results. Thus, a comprehensive study of bachelors' professional training in the field of

'Cyber Security' at US universities and colleges was conducted. In particular, the features of the training structure (flexibility, sociability, autonomy, orientation towards the needs of employers, the diversity of its types, forms of organization and funding sources; social partnership between the State and the community, the interaction of the major participants in the bachelor's study programme in the United States, etc.) have been explored and revealed.

The report deals with the theoretical and practical relevance of professional training in the field of information technology, in particular bachelor's degree in cyber security. The precondition for the mentioned study of bachelors in cybersecurity professional training of Higher education in the United States has become the need to reform the higher education system in Ukraine and the development of advanced models for cybersecurity training and its further development of national higher education systems; *of the need to reform the higher education system in Ukraine and the development of prospective models for training specialists in cyber security for the further national system development of higher education; lack of scientific research and practical development; the government's interest in specialists in related areas what can be reflected in the disciplines chosen for study.* The practical value of following research is to demonstrate the most relevant scientific-methodological recommendations to be used for curriculum improvement and its further implementation into the higher education of Ukraine. The results of scientific research can be used in the psychological, pedagogical and comparative studies; foundation of special courses dedicated to the problems of pedagogical innovations.

The scientific novelty of the obtained results and the theoretical significance of the study is that for the first time in the national pedagogical science a comprehensive analysis of the bachelors' professional training in the field of 'Cyber Security' in higher education American model was carried out; the organizational, pedagogical and didactic principles of the cybersecurity bachelor's professional training in the American higher education system are disclosed; a comparative-pedagogical analysis of the cybersecurity bachelor's professional training in higher education institutions in the United States and universities in Ukraine was conducted.

The peculiarities of the study content are the multidisciplinary nature of teaching and learning, double majors studying, and the introduction of cybernetic security specializations in other specialties, the integration of the theoretical and practical components in the process of specialists training.

The process of students' practical training of the cyber security bachelor degree is the foundation for the qualification level formation of future security industry specialists, in the preparation of which a scientific component should be involved [5, c. 173].

The training of a highly skilled specialist is impossible without the integration of different types of educational institutions into the industrial sphere of enterprises at the state and regional levels, that is, without a practical component of training [1, c. 35]. The development of new state standards for the preparation of bachelors on cybersecurity will make it possible to adjust the conditions for their practical training at a potential job. This is a necessary and very important element of the reform of

higher education in Ukraine, without which it is impossible to qualitatively prepare specialists and bring our education closer to the international level. The study examined the provision of practical training for bachelors in cyber security in the educational process of American higher education institutions.

The comparative and pedagogical analysis of the cybersecurity bachelor's professional training in higher education institutions in the United States and Ukrainian universities gave the basis for the extrapolation possibilities of American experience constructive ideas into the system of higher technical education in Ukraine on the strategic, organizational, and content levels.

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EFFECTIVE WAYS OF LEARNING ENGLISH

Today in our chaotic and quickly changing world it is very important to learn foreign languages. Because of the globalization there appeared a lot of possibilities to contact with many countries all over the world. And so a necessity of using a universal language has appeared.

To learn a language is to have one more window from which to look at the world. This question is similar to “what is the best or the most effective method for learning English?”. It goes without saying that the answer is not an easy one. As academic research has proved there is not just one best method for all learners. Different learners have different objectives, live in diverse environments, have special learning needs and, above all, have different learning styles.

When a person decides to learn a foreign language he wonders what way of learning to choose. This is issue of great concern. Everyone who improves his

knowledge tries to use the most modern and effective methods for making progress as quick as possible.

We all know that learning a new language is supposed to take a long time. There are new rules to memorize and new words to learn. You have to learn and practice and remember tons of things, and all that takes time.

You can always choose the language learning methods that work best for you – but that often means you need to try many different methods before finding your favorite one. You might waste a bunch of time trying other methods that do nothing for you before you find the perfect one.

Having a clear goal (enrolling in a foreign institution of higher education, finding a job abroad, moving in other countries) is the first step in learning English.

There are two most widespread ways of learning English: 1) studying on your own using different tools like books, magazines, comics; English songs (Coldplay, Sia, Adele, Queen, Lucas Graham), videos and movies; TV shows, news, etc; the internet, social networks (Hellolingo, Lang-8, italki, Interpals.net, How do you do?) where you can interact with other English speakers (TED website) or even move to or spend some time in an English-speaking country; and 2) attending a school or an institute, courses.

When you are abroad and you understand that everyone around you speaks English, you are in a stressful situation. Our brain in stressful situations can work more effectively. The main thing is that the panic does not swallow you up. When you understand that you can not use words from your native language and no one can translate to you, you should feel yourself not helpless but independent and self-confident.

If to choose the second way, it is important to understand the various methods and techniques to be able to choose the one that best suits as well as enables to enjoy and profit from learning as much as possible.

Language teaching methods have gone a long way since the time when teaching a second language meant transmitting structural rules, focused on writing, grammar and analysis.

Relevant examples of traditional methods are as follows: 1) grammar translation method (analyze and study the grammatical rules of the language, practice them through translation exercises); 2) direct method (learners develop skills by interacting with their teacher using questions and answers, vocabulary is taught through pictures or real objects); 3) audio-lingual method (repetition of patterns in dialogues and phrases about daily situations, practice is based on drills, repeated till the students' response is automatic, there is very little grammatical explanation); 4) communicative language teaching approach (the teacher facilitates communication while students try hard to interact using English).

Even though there are several other methods and techniques, one is worth mentioning here is blended learning. We consider that it is the best and most modern way to learn a language. It appeals to all learning styles, situations, needs and demands.

This method is a combination of face-to-face (in class) learning with online learning. It is much more than adding computers to a classroom. It means that both students and teachers have to change their approach to language learning. It has to be

carefully designed using customized strategies to balance and enrich the use of both in-class and web contents. It provides an integrated learning experience and gives the student some kind of control over time, place and pace.

This method includes the best parts of the different learning styles above. This method is unique, supportive and personalized.

We can call this a multi method. The name speaks for itself, namely the fact that this method has collected all possible concepts for the study of a foreign language. After all, when you use several ways to learn a foreign language, you will be able to speak this language, read, write as well as to listen.

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FEATURES OF ENGLISH MILITARY SLANG

At the beginning of XXI century against the backdrop of global instability, to a considerable extent caused by various military interventions in the countries of the Muslim world, mostly carried out by coalitions of west countries headed by the USA, one can observe an increased interest in the United States Armed Forces and their allies, first of all Great Britain and other English speaking countries of British Commonwealth. On the part of linguists working in the field of military translation the interest is, first of all, to the language of these countries, especially to the military vocabulary of the English language. However, when considering the military vocabulary, one should also take into account the fact that in addition to established and generally accepted expressions and phrases, rules of communication, there is a fairly large proportion of informal vocabulary. An essential part of such vocabulary is a collection of purely colloquial and expressive words and expressions, called slang.

H.A. Sudzilovsky highlights the terms "military slang" and "military jargon". The latter, in his opinion, is created and used with an esoteric purpose, like a rhymed cockney slang [3, c. 68]. In this paper, however, we do not distinguish between these terms, relying on Lazarevych [4, p. 11], who recognizes the frequent use of the terms "slang" and "jargon" in modern linguistics as synonymous. As a military slang, they understand "the part (layer) of slang in the vocabulary of the English language, which is used primarily to designate military concepts, primarily in the armed forces of the United States and England" [1, p. 33].

Military slang has a rich actual material, it covers virtually all spheres of military life. Almost all concepts, types of property, armaments, military equipment, and many other names are used both in official and informal speech. This is due to the need for a

brief indication of the objects and phenomena in the life and professional activities of military personnel. Also, according to D. Howard [6, p. 188], military slang contributes to the convergence of servicemen who belonged to different social groups before.

Military slang can be divided into 3 categories:

1. Interpersonal relations:

- 1) Daily interaction between soldiers.
- 2) Relations between soldiers, depending on the rank, position, and its branch.
- 3) Relation to military forces by other states.

2. Activities of the military:

- 1) The daily activities of the military, for example.
- 2) Activities during combat operations or training.

3. Servicemen and the world around them:

- 1) Food.
- 2) Uniform.
- 3) Arms and military equipment.
- 4) State of health, body parts.
- 5) Mental State [2, c. 83-84].

Military slang has a wide scope of application, since along with the formalized vocabulary it affects almost all aspects of the life of a serviceman, including purely military concepts, weapons and military equipment, types of property, etc. The reason for such a prevalence of military slang lies in the need for short descriptions for phenomena and objects of military service. Some researchers, for example, D. Howard [6, p. 188], see the reason for the public function of military slang, since the latter can play a positive role in building relationships between servicemen of different social backgrounds. Many words and phrases of military slang are incomprehensible or difficult to understand to the majority of the population (especially in the period of their appearance and transition to a wider sphere of use). H.A. Sudzilovsky in the work "Slang - What is it?" emphasizes that it is widely used in the armed forces of the United States and England. It cannot be unnoticed that many words and phrases in this part of the vocabulary are common for both armies. But there are a number of differences in its use by servicemen of these countries. Some words and phrases which are used in the US Army are not known in the British Army and vice versa. Sometimes this is due to differences in the organization and technical equipment of armies [1, p. 33].

It is known by Yu.H. Kocharian, there is no second lieutenant in England, therefore there are no slangisms "*Jeeter*", "*2-ond John*" which are used in the US armed forces. The British Army does not use the words "*loot*", "*lieut*", "*lute*", since they are abbreviations of the American version of the pronunciation of the lieutenant [*lu'tenənt*], in the British army this word is pronounced differently [*leftenənt*] [1, c. 33].

The US Army does not use the phrase "*one pippin*" - a lieutenant (pip - a star on the shoulder boards of an English lieutenant).

From the point of view of usage, according to L. L. Neliubina [5], military slang can be divided into two parts. The first part (relatively small) is used quite widely and is part of the broad vocabulary of the popular English language. For example, *leather neck* – морський піхотинець. The second part (more numerous) has a narrow scope of use, limited mainly by the armed forces of the United States and England. For example: *loot* – лейтенант

Consequently, we can conclude that military slang is an emotionally colored vocabulary. It is characterized by a more or less pronounced familiarized color of the vast majority of words and phrases. Speaking about the US or British Army, we understand that these states have thousands of units, new equipment and weapons that grow every day. Each branch receives a specific materiel that is intended to perform certain tasks. For convenience, the military often invent their own names for weapons, which are easier to remember, because the names are caused by certain associations and they have a certain comic effect. Due to this, slang in the military vocabulary increases in the amount that is widely used by all the armed forces of the world. Summing up, we can recognize that slang is a phenomenon that should be monitored and researched, try to select or even create equivalents in the native language for a more precise translation.

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IMPROVEMENT OF STUDENTS' INDEPENDENT WORK IN FOREIGN LANGUAGE CLASSES

The aim of this study is to investigate students' independent work in foreign language classes as well as to find out the ways how to improve it.

Nowadays, the development of Ukraine lies in the expansion of international relations and integration into the European community. The dynamics of social processes determine new strategic directions of the educational process reformation in order to enable the higher educational institutions to train competitive professionals.

Independent work is one of the available and proven ways of increasing the effectiveness of the lesson, activation of cognitive skills of students. It plays a significant role as the student truly acquires knowledge only in the process of improving independent learning activities.

The role, place and tasks of independent work in the learning process was grounded by K.G. Chiknaverova (Chiknaverova, 2016), Y.A. Komensky (Komensky, 1982), E.A. Krylova (Krylova, 2015). Scientists tried to show the increase of the degree of activity and independence of students in learning process and identify the ways of development and techniques of organization of students' independent work.

The analysis of studies devoted to the problem of organization of independent students' work has shown that independent work is such a work, which is performed without direct participation of a teacher, but according to his instructions; when the students consciously seek to achieve the goal, using their efforts and expressing in some form the result of their mental or physical actions.

Its implementation requires a high level of awareness, reflexivity, self-discipline and personal responsibility; it should give satisfaction to a student as a process of self-improvement and self-knowledge.

There are some difficulties for students to be independent learners. They are as follows: lack of confidence, lack of learning strategies and lack of connection between student interests and university content.

Students may have had negative learning experiences that have created an image of themselves as poor or incapable learners. So, firstly, teacher should be aware of how to build self-confidence in students, particularly when it comes to teaching speaking skills. Students may also be stuck with a limited set of learning strategies that do not work for them in a variety of situations. Thus, secondly, teacher should properly select and focus topic and information needs of each group of students, identify learning resources as well as determine the effectiveness of the whole process in order to choose effective learning

strategies. And the last but not the least important is connection between students' interests and university content. Students are not motivated to learn about topics that have no personal connection or resonance for them.

The most pressing issue at the moment is that students study in groups with different levels of foreign language proficiency. Taking into account the number of hours to study a foreign language at the university as well as the number of students in the group it is difficult to raise the lowest level without lowering the highest. In this situation the independent work of students with lower level is vital to succeed.

In order to make students independent learners teacher should give them projects and tasks that require to find information for themselves and demonstrate what they have learned in a way that is meaningful.

Students should study English for 30 minutes every day instead of 2 hours once a week. During this time they won't be tired and their brain will be filled with information. After some time it will be their habit. They should speak English with friends, write new words and stick them in a prominent place, it will help them to learn new words more quickly. Last but not the least, English films are very good backbone in studying English.

For this purposes students should attend special sites, for example, Woodward English (Woodward English, 2018), Loyal Books (Loyal Books, 2018), Jamie Oliver (Jamie Oliver, 2018), Speechyard: Learn English online (Speechyard.com, 2018), Leengoo (En.leengoo.com, 2018), BBC Learning English (BBC Learning English, 2018), Exam English (Exam English Ltd, 2018), engVid (engVid, 2018), English for everyone (Englishforeveryone.org, 2018).

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"HYPERION" VON F. HÖLDERLIN UND "HYPERION" VON J. KEATS: ÄHNLICHKEIT UND UNTERSCHIEDE EINER INTERPRETATION DES ANTIKEN MYTHOS VON HYPERION IN EUROPÄISCHEN ROMANTIK

Frederick Hölderlin war der erste, der eine literarische Interpretation des Hyperion-Mythos schuf. Literaturwissenschaftler schreiben über den möglichen Einfluss von Hölderlin auf John Keats, aber es gibt keinen Beweis, dass Keats die Arbeit von Hölderlin kannte [1, s. 91]. Das kulturelle Erbe des antiken Griechenlands wurden für beide Autoren ein Ideal des Schaffens und der Kultur [3, s. 6; 1, s. 93]. Der Einfluss der alten Griechischen Kultur auf die Autoren ist sehr bedeutsam. Aber Hölderlins Verständnis für die Antike dunkel und durchdrungen von Idee vom Leiden waren [2], während Keats sah die antike Welt als schöne Utopie [1, s. 92].

Hölderlin beschrieb in "Hyperion" die Probleme seines zeitgenössischen Deutschland durch die Ereignisse am Ende des XVIII Jahrhunderts in Griechenland. Am Anfang sehen wir einen Versuch den Griechen 1770 gegen die Türken zu revoltieren. Das ist eine direkte Parallel mit dem Mythos. Die mythologische Idee, die Götter durch den neuen Generationen zu ersetzen, die in Hölderlins Roman durch den Gedanken über die Notwendigkeit einer Revolution in Deutschland bedingt ist, ist im

Roman in Bildern des Aufstandes des griechischen Volkes dargestellt. Im Zentrum vom Roman ist ein aufrichtiger und heller Junge Hyperion. Um den Protagonisten zu charakterisieren, ist das wichtigste Ding, dass er ein Kämpfer für das persönlichen Glück und das Glück des und Griechenlands ist. Darum ist er eine Projektion des mythologischen Titanen auf die Gegenwart des Autors, als Deutschland im Niedergang war. Die moralische Entwicklung des Protagonisten zeigt den Prozess, mit dem die alten Ideale durch die neuen ersetzt werden, obwohl sie den traditionellen Mythos nicht wiederholt. Hyperion ist, wie Hölderlin selbst, enttäuscht von seinen Träumen, von einem revolutionären Kampf, und für ihn wird das Leben selbst, die Selbstverbesserung und die Einheit mit der Natur der höchste Priorität. Am Ende kommt der Autor jedoch auf die Idee der Liebe, die wichtiger ist als die umgebende Realität und der wirkliche Kampf.

Im Gedicht "Hyperion" überdenkt J. Keats den traditionellen Mythos auch in einer romantischen Tradition und setzt in seinem Zentrum Hyperion - einen ideologischen und aktiven Führer der Titanen, der sie zum Kampf inspiriert. Der Wechsel des Alten zum Neuen ist das zentrale Motiv des Gedichts, und der Kampf der Titanen wird eine Illustration der grandiosen Idee des historischen Fortschritts. Keats glaubt an die Notwendigkeit der menschlichen Evolution, um das Ideal absoluter Schönheit und Harmonie zu erreichen. Er glaubt, dass Dichter diesem Ideal am nächsten sind. Keats wiederholt mythologisches Sujet über den Aufstand der Titanen, aber setzt neue Akzente. Der Dichter stellt eine Figur Hyperions in die Mitte und betont die Bedeutung einer Person, die die umgebende Realität verändern kann.

Wie Hölderlin, unterstreicht Keats Hyperions rebellischen Charakter, Kampfbereitschaft, Selbstaufopferung und Kraft des Geistes. Der Autor betont die Notwendigkeit der Veränderung und schafft eine Hymne der Evolution. Für Keats ist der Sturz der Titanen kein tragisches Ende des Kampfes, sondern der Beginn einer neuen Ära, die besser sein wird. Anders als Helderlin, wer nach der Vergangenheit sich sehnt, glaubt Keats dass Zukunft glücklich ist. Das heißt, für Helderlin und für Keats war die Verwendung des antiken Mythos notwendig, um die symbolische Figur von Hyperion - Kämpfer, Revolutionär, starke Persönlichkeit - zu interpretieren. Die Autoren kommen jedoch zu unterschiedlicher Schlussfolgerung über die Notwendigkeit weiterer Kämpfe.

Daraus können wir schließen, dass beide Autoren ihre eigenen Mythen über Hyperion schafften. Romantische Interpretationen des Mythos haben Wiederholung der mythologischen Handlung, die Betonung der Rolle eines starken Menschen in der Geschichte und die Verlagerung des Fokus der Geschichte auf den Protagonisten.

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MILITARY RADIO TRAFFIC SLANG IN NATO AF

Military slang is a set of colloquial terms which are unique to or which originated with military personnel. They are often abbreviations or derivatives of the NATO Phonetic Alphabet, or otherwise incorporating aspects of formal military concepts and terms. Military slang is also used to reinforce the (usually friendly) interservice rivalries. Some of these terms have been considered gregarious to varying degrees and attempts have been made to eliminate them.

For the purposes of this paper, "military slang" includes slang used by any English-speaking armed forces (armies, navies, air forces). The invention of portable radio transmitters has made it possible to coordinate the actions of army units even at long distances. Later the transmitters became small and simple, and quite cheap, thus making it possible to equip not only every unit, but every soldier with it. That resulted in working out strict rules of carrying out radio traffic to avoid the distortion of important information, especially under the conditions of warfare.

Quite gradually, the radio traffic slang began to penetrate into the civil communication. One can make across with it in any genre, even in school comedies for girls. In one of them, the main character, a girl, is going to make advances to an attractive boy, and her friends standing by are trying to comment on the process. "Target locked...Engaging... three... two... one... a – a – and we have contact". One more example can be taken from the children's computer game "The Ice Age". The opossums find themselves in the plane crash on the pterodactyl which is being shut down. They are crying: "May day! June day! July day!", which was translated as "SOS–save our ears!"

General rules

Rule 1. The tactical radio traffic must contain very short phrases. First, this can be the symbol of immediate actions life depends on. Second, the channel must be released for other messages as soon as possible. Hence, the translation has to sound short and clear as a telegram.

Rule 2. Any message has to be built according to the corresponding scheme:

- 1) Who is the message addressed to?
- 2) Who is sending the message?
- 3) The text of the message;
- 4) The concluding part: if the answer is expected the word *over* is on air (it means "Handing over to you!"). If the conversation is over, "out" is used meaning the channel is free. If the call-sign is accompanied by the word "actual", it means that the unit commander whose call-sign is used is in contact.

An example of the broadcast:

“Foxtrot-6, this is Lima-1 – actual, come in, over”. With respect to simplifying the message and economizing on time, typical, frequently repeated situations are described by auxiliary words which testify to the importance of the message. For example: ROUTINE (traditional), IMMEDIATE (urgent message), FLASH (express-message) – extremely important message (extraordinary). The signal of its transmission is repeated 3 times: FLASH-FLASH-FLASH (attention express-message).

Hazard levels:

Code green (safe), yellow (hazard is not confirmed), red (dangerous).

Introducing changes, or checking up the message corrections:

CORRECT/CORRECTION/I AM MAKING CORRECTIONS, that means literally: “There was a mistake in the message, and I am repeating what I said, having changed the erroneous info.” Example: “Disregard this transmission” – The transmission is erroneous. It is cancelled. “Read back” – Repeat the message you get to be checked up.

Confirmation:

To confirm that the message is accepted, the words COPY or ROGER (“I got you”) are used. There are cases when ROGER is translated as “SIR”. But that is not true. ROGER is just used to confirm that the message is accepted. “Yes, Sir”, “Sir” the translation are interpreted as WILCO (“will comply” or “will do”).

Why ROGER? In fact, beginning from 1927 up to 1957 ROGER stood from the letter R (before that it was “Rush”, and now “Romeo”). It means that the message is received.

The message recurrence:

The key information of the message (for example, the coordinated or the number of the enemies) can be repeated. In this case the words “I REPEAT, I SAY AGAIN” are used and the core of the message is repeated (though without call-signs).

A short literary digression:

When doing a literature review the only expression I came across was “I repeat”. As it turned out when artillery is used, the expression “I say again” is on air. If on the background of interference the word “REPEAT” is used, it can be perceived as a signal of a repeated artillery strike against the enemy positions.

The phonetic ABC:

Under the conditions of the weak signal or due to interference, the information can be misheard. With this in view, the key words can be spelt and every letter can stand for a separate word. It is so-called phonetic ABC.

Radio transmission abbreviations

The phonetic ABC can be used not only for spelling certain names, but also for broadcasting coded information. The so-called Alpha-code which can be confidential and change day by day, there are standard, non-confidential ones.

Romeo Tango Bravo – return to base;

Romeo Papa Alpha – Rally at Point A;

Hotel Alpha – Haul ass (move quickly in the direction specified);

Hotel Echo – High Explosives.

Mind the abbreviations

AA – Anti Aircraft;

AAA – Anti Aircraft Artillery;

AAR – After Action Report;

AB – Ambush;

AO – Area of Operation;

HE – High Explosive;

HQ – Head Quarters;

KIA – Killed in Action.

Military slang is an array of colloquial terminology used commonly by military personnel, including slang which is unique to or originates with the armed forces. In English-speaking countries, it often takes the form of abbreviations/acronyms or derivations of the NATO Phonetic Alphabet, or otherwise incorporates aspects of formal military terms and concepts. Military slang is often used to reinforce or reflect (usually friendly and humorous) interservice rivalries.

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MORAL IN POLICY

Actuality of theme. The problem of moral is the focus of the modern political world. It plays a significant role in government process. And scientists can't make a consensus about this issue. It is difficult for scientist to determine when the government can use amoral methods? Can they use these methods at all?

The research aim is to investigate this problem and to understand is it necessary to forget about moral in the process of managing the country and how to use this ability in appropriate way.

Results and discussion. Let's determine a definition of moral. It actually has a lot of description and a lot of scientists, such as Sergei Rubinstein, Immanuel Kant, Oleksandr Titarenko tried to describe this term as accurately as possible, but we will use only one that psychology provides. [2, c. 125], Moral is the part of psychological structure of personality that gives us an estimate of things in unconscious way. Moral is the set of reflexes that are formed owing to the fact that we are afraid of social court. So it is the set of performatives that were established in the past.

And we can find out some other definitions of moral, that was given by Georg Wilhelm Friedrich Hegel, like moral is the way how to reach happiness. And now I will back to the notion of policy. There is one ideology, that the essential part of which is to reach happiness for country in whole and for every citizen (national). It is Juche ideology that exist in nowadays in North Korea. The main goal for government is to achieve economic and political freedom, to be independent from other countries. That's incredible to be a free man, to be a free country. But we can't actually call the way and methods they want to reach it a moral way.

As we noticed before, moral is a type of freedom, type of independence. Political philosophy gives us two types of freedom: negative that was pointed by liberalists and negative freedom that was described by adherents of the republicanism theory. What about negative freedom. You are free when no one compels you, no one force you to do something. Positive freedom is described as a freedom of development, when you can develop yourself without any obstacles. It can be extrapolated on the relationships between slave and master. Imagine that the master has good mood today and he doesn't disturb you, doesn't offend you, just doesn't touch you. By liberalists you are free but you are still a slave. But for republicans you are not free. Freedom cannot depend on the mood of master. Freedom is constant, it is the way of development, the way to overcome obstacles.

We want to point out about one philosopher Niccolò Machiavelli. A lot of people make a huge mistake saying that Niccolò thought that policy has to be amoral. But that's not true. Machiavelli didn't claim that police has to be amoral but he considered that it is amoral unfortunately. In his famous book "The Prince" Niccolò Machiavelli noticed that every good prince should have the ability to refuse his kindness at all. Because you can't manage the county well leaning only on the moral side. [1, c. 75],

Conclusion. In our humble opinion you can't as a sovereign use only moral side. Because, as Aristotle said, nation is a reflection of a ruler, and ruler is a reflection of nation. So if regent do terrible thing for nation that means that nation did it before for a prince.

And we want to suggest that if you want to build a new country and to manage this country using only moral methods you have to create a new society with new moral principles.

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READING AS A VITAL PART OF LEARNING ENGLISH

Reading is one of the most important means of obtaining information, thus the ability to read in English is an essential aspect of professional skill in our times.

From the very beginning, the process of learning to read in English is the most highly developed type of students' speech activity. It means that reading is the main way of satisfying the cognitive needs and the main source of getting necessary information for future specialists – from books, the press, scientific literature and the global Internet. In addition, reading is the most affordable method of learning English in the absence of a foreign-language environment.

Reading has different levels ranging from the ability to understand the indicative content of the text to its creative assimilation, when the reader accepts, compares and analyzes information or simply can learn something new. To teach reading in English means not only to create the preconditions for expanding the level of general education, but also to give the opportunity to get new information in a timely manner to every specialist. So, it is a main condition of successful professional activity in modern science and technology.

In order to determine a rational sequence of learning to read in English it is necessary to consider the difficulties that can arise while doing this activity. These kinds of difficulties can be divided into three categories: 1) the difficulties related to the discrepancy between sound and writing systems of the English language; 2) the difficulties related to the accent in different types of words while reading aloud; 3) difficulties that occur during the putting logical stress in sentences.

The reason for these difficulties is that rules of word stress and word order in the sentence in English language differ from native one. To solve these kind of problems there are variety of techniques and methods. After analyzing various Internet resources and scientific literature, it has been found that, there are three the most effective methods (Table. 1).

Table 1. Methods of learning to read in English

<i>№</i>	<i>Methods (the author)</i>	<i>Characteristics</i>
1.	Skliarenko N.K.	<i>Main steps:</i> 1) learning the alphabet; 2) learning how to write letters; 3) learning letter groups (letter combinations); 4) learning basic reading rules; 5) develop correct pronunciation (read aloud); 6) develop an ability to understand meaning of the words;
2	Michael West	1) the frequent repetition of you have learnt; 2) learning grammar rules; 3) “Read and Look Up” – you should read a phrase or sentence silently as many times as necessary, then looks up (away from the text) and then repeat them in aloud.
3	Ilya Frank	<i>Read certain type of books:</i> 1) read text with the prompts; 2) to look for a translation of unknown words in the adapted excerpt; 3) read the original (unadapted) text; 4) move on to the next adapted excerpt.

After analyzing the information given in the table, it can be defined that these methods are more general. Sklyarenko's method can be described as the alphabetic method and the phonic method because it depends on understanding of the alphabetic principles and learning series of basic phonic rules. These are the foundation for success in reading. After learning these rules, you can move to the next level of learning – the look and say method. It means that you should read by memorizing and recognizing whole words, rather than by associating letters with sounds. This method is very similar to “Read and Look Up” suggested by Michael West. However, this theory pays much attention to the so-called “reading for understanding”, when the reader is only interested in the main idea of the text, but not in the meaning of each word. In this context, there is the main drawback of this method – it can not be used when you read specific professional texts. The method of Ilya Frank is very similar to the sentence method and the whole language method. First of all you pay attention to phrases and sentences and later you can analyze them due to their verbal and alphabetic components. By using this method you learn and memorize new words and phrases by encountering them in meaningful contexts rather than by phonics exercises.

In conclusion, reading is really an essential part of learning English. Thus, we suggest combining the components of the three methods, which were mentioned previously, because this sequence of learning to read, in our estimation, is the most effective.

UDC 811

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GRAMMAR TRANSLATION METHOD VERSUS COMMUNICATIVE LANGUAGE LEARNING

One of the main tasks facing modern education is the education of a person with a high cultural level, who has an ability to navigate in the modern world.

Involving students in the practice of communication at the interstate level, participation in intercultural dialogue enables the practical realization of their intellectual and personal potential. It requires a high level of communicative culture, communicative competence, developed communication skills.

The article examines approaches of teaching foreign language according to Communicative Approach. The communicative approach helps to improve language speaking skills.

Communicative technique exist to replace the usual method of teaching by means of books, the study of grammar and the implementation of the same type of exercises, reading and translating texts. When using the grammar-translation method, students learn to translate correctly from their native language into foreign and vice

versa as well as to study grammar in depth. However, a student, who can translate texts perfectly in written form, can not speak a foreign language. Communicative methodology eliminates these gaps.

An important task for the students, who study foreign language, will be vocabulary enriching. This purpose becomes a serious problem for many students. Someone builds associations, someone remembers words only after hearing them somewhere or using them in speech. The teacher's task is to check how well the student has memorized new words. There is an effective method that develops both memorization of words and communication skills in a foreign language due to communicative approach.

In this way, teacher prepares cards with new words before the lesson and puts them so that the words can not be seen, then students are divided into groups of 2 people. The first student, pulling out a card, sees a word, which he or she tries to explain in a foreign language to his partner. The second student should guess what word the first student explains, and then name it in a foreign language. Thus, students are themselves explaining each other words, which makes them "feel" these words. By doing this, new words are better absorbed by students.

Another way to check the level of student preparation is the game, which uses a presentation prepared at Power Point. The teacher shows the explanation of new words in a foreign language. The first student who will call this word is getting one score. A student, who will score more points will win. Thanks to the spirit of competition, students will learn new words properly. In addition, the process of checking new words passes without going to the native language for students, which is very important, since it is necessary to complete immersion in the language.

Improving the students' perception of foreign speech by ear, will be better with organization various videos (films, cartoons) both adapted and original (for students with a higher level of foreign language skills). However, it is necessary to check that the students understood from the viewed material. To do this, teacher has to discuss the video, ask students questions, ask them to express their opinion on the subject raised in the material.

There are a lot of people, who criticize communicative approach, saying that using this method does not allow to learn the grammar. In reality, this is not the case at all. Grammar is studied intensively, but the process of submitting information is different. After the teacher explains the new topic, the students are divided into several groups. After that, teacher gives the task to each group, basing on the topic of the lesson. When the task is completed by students, they discuss and argue their choice. As a result, each group presents its answers to the teacher. The teacher checks and explains mistakes in a foreign language.

The classical grammatical-translational approach is oriented toward academic language learning: it gives an in-depth understanding of the grammatical structure, a steady skill in written speech. Communicative approach is aimed to successfully develop the abilities of oral communication, it creates an additional motivation to learn the language, which ensures the student's interest and, therefore, efficiency and effectiveness.

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FASHION LEXICON OF THE XX-XXI CENTURIES

The aim of the article is to analyze the importance of fashion and the emergence of new trendy terms in today's society, show how fashion influences the human style and how it changed them. This article focuses on fashion lexicon which is highly enriched and improved.

The concept of fashion vocabulary was investigated by Kovalenko Ganna - Candidate of Philology. She investigated the cognitive mechanisms of formation of new lexical items. She studied means of novelty and colour as key factors in fashion. The research was also conducted by Poplyovina Vera Aleksandrovna. She explored the fashion as a social and cultural phenomenon. However, little research has been undertaken to study the analysis of the emergence of new words or neologisms in fashion for several decades.

Fashion is a form of manifestation of culture, it is a reflection of reality, manifested in behaviour, but mainly in clothes. Fashion changes very often. Fashion sets certain rules of behaviour and style of dress, and the man who does not comply with the rules risk being branded as "unfashionable". However, there are rules that never go out of fashion, for example, the classic style of dress. During the XX-XXI centuries there have been many changes in fashion that led to the emergence of new fashion trends, words and terms.

The article deals with fashion of the XX-XXI centuries. One of the most important aspects in fashion that it is not static as changes in social life immediately cause changes in fashion. A central issue in the article is an analysis of the emergence of new words or neologisms in fashion for several decades. In general, this analysis shows that not everyone can withstand the impact of fashion and appearance of new fashion words. They affect a person by the fashion catwalks shown on television or on the covers of popular magazines. Sometimes they are not perceived at first, their understanding happens only when they become fashionable due to the frequent change of aesthetic tastes and preferences.

Moreover, fashion often changes with the change of the season. During the last decade fashion research has increasingly demonstrated that both men's fashion and women's fashion have their own specific trends in its development. So, women's fashion is characterized by emotionality. For men mobile phones, cars and prestigious are much more important than fashion itself.

At the end of the decade in fashion there is "a dress looks like a man one, but it is a woman dress". There are also popular jeans Slim Fit - with a high waist, narrowed down or straight throughout. A striped or plaid shirt is an essential feature of business lady.

Furthermore, in 1962 Mary Quant fills her boutique with mini-skirts in central London. 60s are the last decade for Capri (Capri), then people forget about them until the late 90s. But in this decade, they are at the peak of glory. Since 1965, dates back to the hippie movement. There are pants-bananas. They are comfortable and they suit almost everybody. Later the style of American Students Ivy League (Ivy Style) arises. It is the style of golden youth of the 80s, it is also called - style prepp.

That is why, the development of fashion has led to the emergence of new trends and new words in the fashion world.

Although considerable amount of research has been devoted to clothes, the 80s open season with the cult of the body, massive jewelry and bright colours. Previously shoes were only for athletes, but now they are worn by everyone regardless of gender and profession. Trainers Reebok and Adidas become very fashionable. The smoking for women by Yves Saint Laurent is the most striking invention of the era. Then court shoes on a low heel appear which Princess Diana invariably dressed. Lady Di has always been considered to be an icon of femininity and impeccable taste. The trend of 80s is white boats.

In addition to this, one of the key trends of fashion in the nineties is a pair of jeans. Both men and women can wear them. In addition to this, at the beginning of 2000s the minimalism style occurs. It means a minimum of decoration. The early fashion of the 21st century is a blatant violation of the rules and style trends that have emerged during the last time. Mixing styles in the fashion of the 21st century is one of the factors that makes up a complete image. The history of fashion in the 21st century is not yet written, but the basic trends dictated by the world's catwalks and fashion bloggers have the courage and disposition for experimentation which will create its own unique style. The emergence of a huge number of updated fashionable neologisms appears in fashion vocabulary of this century. Among them: Bomber (Bomber) - short light jacket; Blazers (Blazer) - jacket with V-neck; single-breasted or double-breasted, it was the prototype of naval uniforms. Slipony - summer shoes without laces. Jeggings combine two types of clothes - leggings and jeans.

The paper examines new fashion trends which exist nowadays in the world. It would be interesting for everybody to learn new fashion words. Everyone is required to be modern, stylish and smart in different fashion trends. The purpose of this paper is to give new and interesting information about fashion of the XX-XXI centuries. The present study has analyzed that every decade of people's lives has changes taking place in the fashion industry and reacting differently to them, making the development of fashion and involving new terms and words, as the result enriching and expanding fashion vocabulary.

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INTEGRATING ENGLISH LANGUAGE AND COMPUTER TECHNOLOGIES

At the end of the 20th century, modern computer and Internet technologies have taken an essential part in our everyday life. It is impossible to overestimate huge opportunities available for us nowadays. The development of computer science has affected our way of living, work and even many processes in the language, which has transformed wide range of people into active computer users and encouraged young generation to connect their future life with computer programming [see eg. 2, 3, 4].

In the age of globalization, the world has been changed into a village where English is perceived as a universal language for international communication and cooperation. English is considered as the dominant language of technology and computer because instructions, messages, and Internet texts are generally in English. Also, English is the most commonly used language among ten top languages exploited for communication and interaction via the internet and almost two-third of websites on the Internet are in English [5, p. 175].

Due to these facts, the problem arises how knowledge of English language is interconnected with computer technologies.

Therefore, the **aim** of the article is to analyze how English language and computer technologies are interconnected.

For the realization of the aim the following **tasks** are set:

1. to analyze connections between language of computer programming and English language;
2. to specify peculiarities of computer slang;
3. to reveal the importance of English for computer programmers;
4. to investigate the role of English in international cooperation;
5. to examine usage of English in the Internet.

The **object** of investigation is English language and language of computer technologies.

The **subject** of the research is tight connections and similar characteristics between English language and language of computer technologies.

The research **methods** are those of descriptive and contrastive analysis.

Our point of view is that English and computer are two inseparable things and there are several facts that can prove it.

The research identifies that due to the active spread of computer technologies many computer terms, previously known only to narrow specialists, have become widely used by simple computer users. It gave a push to the emergence of specific computer slang, which can be divided into two groups:

1. professional language of programmers and other people whose job is connected with computers;
2. area of professional language available to ordinary computer [1, P. 240-242].

There is one main similarity between these two slangs – both of them are words taken from English language. This is due to the fact that the motherland of computer technologies is the United States of America. These technologies are rapidly developing and when they enter our country, there is no equivalent in our language. That's why we start using original terms. For example, *monitor* (монітор), *device* (девайс), *hard drive* (хард драйв), *message* (меседж), *Windows* (віндоуз).

The next point to analyze is the fact that all computer languages are based on English. Every computer language consists of English words, for example, *if*, *else*, *for*, *while*, etc. Let's observe usage of English on the example of the code: *for bukva in stroka: if bukva == "a": print (bukva)*. The following keywords are used here: *for*, *in*, *if*, *print*. To understand the identifiers it is enough to have an intermediate level of English. A beginner programmer will be able to figure out that *for ... in ...* (для ... в ...) is a loop, *if* (якщо) is a condition, *print* (друк) is to print text on the screen [2]. If programmer is good, you can read his code like text and you'll understand everything. If you want to possess yourself as a professional programmer, you shouldn't call your functions in "translit" like *vstavitText*, *otpravitEmail*. You should call it in English: *putText*, *sendEmail*. If you use transliteration, you will be disrespected.

As we can see from the example, the best computer programmers aren't just good at writing codes, they are good at using English too. Every programmer should follow the rule "Think twice, code once". That means when you write codes, first of all you think what you will do. Then you transform your ideas into code using symbols, numbers and commands in English. In such way programming language is closely connected with English.

Thus, language is a key factor in computer system interfaces and much of computer use entails language including reading texts and instructions, seeking information, following hyperlinks and sending and receiving messages. Programmers that have language problems and low English proficiency may be particularly vulnerable to experiencing anxiety in computer use [5, p. 176].

Special emphasis is given to the fact that English is an international language. Consequently, knowledge of English is of great importance during meetings with foreign developers, colleagues, clients and investors. Furthermore, the possibility of an internship abroad is not excluded. In addition, knowledge of English is the first point to take into consideration when you are looking for a work in a good IT company [2]. For example, such companies as Viseven, Infopulse, EPAM, SoftServe, Luxoft, Oracle, DataArt, EVO, Ciklum, Netcracker, ZONE3000, Lucky Labs function in Ukraine (for instance, in Kyiv, Odessa, Kharkiv, Lviv, Zhytomir, Dniper, Vinnica) and give an opportunity to get working place abroad. As you can see, even simple English skills give you an advantage to other IT specialists, because it is one of the essential components of professional competence.

A lot of Ukrainian startups appear and want to introduce their own ideas to Europe, USA, UK and Asia, because these markets are more competitive. They need to know English to show their projects to English speaking potential customers [4]. The idea can be innovative and quite good, but they can show it in the worst way, because presentation is a 60% of success, so creators need to explain it and make investors or clients interested in their project.

Also we should take into consideration the fact that every programmer can have problems. After trying to solve the problem, he will search Google looking for Russian or Ukrainian solutions. And if he can't find solution, he should try to find it in foreign web-sites. There are far more helpful foreign forums than Russian or Ukrainian, because the biggest part of programming literature is written in English. It goes without saying that you can find it in Russian or Ukrainian, but it isn't written in this languages. It is just translation from English.

The **main conclusions** drawn from the study are that knowledge of English is an important component of a professional competence of a programmer. The case for foreign language ability is obvious when employment potential is concerned. A tendency for continuous development and self-education is impossible without knowledge of English in a programming.

Nowadays there are a lot of conferences, online reports and other webinars which can improve you knowledge. Teams of programmers gather together and discuss problems or make decisions considering programming. For example, All Your Base, Developer Week, PyCon, Redefine, SsasConf, HTML5DevConf etc. Every topic is accompanied by English language. So if you don't want to run in back, you should learn English language.

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MIND MAP AS A MODERN METHOD FOR PROCESSING THE INFORMATION

All of us since our school childhood, used to hear: "Do not use a crib. It only hurts you!"

We perceive this petty thing as something forbidden and unnecessary for us. But scientists have proved that the crib is not only harmless, but it can also be useful to fill the memory with a large amount of information [3]. The inventor of the Mind Map method is Tony Buzan, an English author and educational consultant.

The topicality of the research: Nowadays we have to deal with a huge amount of information, new vocabulary and terms literally every day. The mind map approach provides the efficiency of learning and studying. There are different kinds of arranging the information, which is necessary to present and to analyze.

The aim of the research is to analyze the mind map method as a way of processing the information and cope with a big amount of it.

The results of the research can be applied in foreign language learning, in managing the ideas during any kinds of brainstorming, and in other situations when a big amount of the information has to be processed.

Results and discussion:

Today, this method has got a name – *mind map* (also: *memory card*).

A memory card is an image or a diagram of new words, terms or facts [1;4].

In foreign language learning, vocabulary mind maps are also often referred to as *word maps* or *spidergrams* [2] that show the interconnection between words and the way of their categorizing and logical links between them.

This technique is also good for studying and processing the information, because long and complex sentences there are replaced by simple words to be memorized.

In addition, the use of bright colors, small drawings, arrows, and other kinds of lines to combine words into one helps to rearrange the information in logical order and visualize it for better perception.

The map of the mind can have any kind: the tree from which the branches grow; a table with thematic columns and lines; the house where each subject has a personal purpose and name, etc. But the main thing is always the theme of the card. It should have a centre and central significance, on which all the other informational links will be built.

The use of such cards is wide enough.

They are used primarily in education:

- maps of thoughts transform the volume of lecture material to a visualized minimum;
- they engage the audience's interest;
- make the process of studying and memorizing the necessary material pleasant and easy;
- memory cards create an opportunity to assimilate the material quickly, etc.

Mind maps can also be used to record protocols of telephone conversations, negotiations, agreements, interviews, etc.; in this case, you can create a map of mind in the form of a clock.

When it comes to structuring large volumes of text, it is necessary to turn to a map of thoughts in order to reduce this volume to a comprehensible minimum.

Often such a card is used in the method of brainstorming when it is necessary to generate quickly new ideas and approaches to the solution of certain problems. So, in one piece of paper, you can combine different answers and suggestions and see the picture as a whole.

Cards of the mind are also used while reading a particular text, or when a person seeks to find some answers to their questions; it allows to rearrange the thoughts and, so to speak, to fix the essence of the work, so that it is easy to recall later the contents of the material read.

The advantages of using a memory card:

- they can help both in work, in training, and in personal development;
- during the compilation of the mind map, we develop our creative and logical thinking, creative approach, imagination and ability to abstract;
- mind cards provide the possibility of quick retrieval of the information;
- a large amount of information is reduced to a few words;
- you can quickly recall the necessary information;
- reducing the time of learning the desired material;
- you no longer need to burn the midnight oil, because studying becomes an interesting and creative process;
- boring notes become bright and easy to hold ones;
- mind maps develop a creative approach to the work that needs to be done;
- separate fragments are combined with each other with logical links;
- memorizing of the necessary information quickly becomes real and even easy to complete, etc.

Apart from the fact that memory cards can be created using ordinary pencil and paper, they can also be created electronically on a computer with the help of ordinary office or special programs [2;3]. As for them, there is another advantage – the flexibility of the memory card – the ability to replace the unnecessary information or add a new one quickly, to change the location or order of the information, to complement it all with pictures, music, and other effects which facilitate the perception.

Conclusion:

Consequently, memory cards or, plain, cribs are widely used in various spheres of social life. They help to memorize hard information, make boring information interesting; they promote the development of creative thinking, imagination and much more. This is an ideal option for those who are tired of spending time studying large volume of material which quickly escapes from the mind.

A mind map is a kind of small, but rather important breakthrough in the world of intelligence and memory.

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Session work №5

CURRENT RESEARCH IN THE FIELD OF MEDICINE

UDC 616.005

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THE NOTION OF REANIMATION, TERMINAL STATES AND CARDIOPULMONARY RESUSCITATION

The aim of this study was to investigate the notion of reanimation, terminal states and cardiopulmonary resuscitation and their relevance in the work of future medical specialists. On the basis of this research the recommendations for future medical specialists in coping these processes were given.

Life is a continuous process of exchange, which needs to be studied in a proper way every single moment especially taking into consideration the work of future medical specialists. Various pathological factors can disrupt this process, which is accompanied by disorders of body organs and systems. In that case a disease may develop. If in these cases the compensatory reactions of the organism are depleted or do not have time to react, there is a threat of its vital activity - the terminal state. First, it is needed to explain the notions that are given below.

The terminal state is a state that borders between life and death.

Reanimatology - the science of reviving the body, the prevention and treatment of terminal conditions.

Intensive therapy - treatment and support of human life.

For the life of a person it is necessary the oxygen to enter the body and carbon dioxide to be released.

Life interruption – death, may occur suddenly or predictably, as a natural consequence of old age or incurable illness. Terminal states

Transmission – livelihoods in a state of deep exhaustion (darkened consciousness, pale skin, AP is low, pulse is fast) can take several minutes, hours or even days.

Terminal pause – the patient loses consciousness (arterial pressure is low, pulse cannot be measured, stop of breathing, reflexes are absent) lasts a few seconds to 2-4 minutes.

Agony – the state of extinction of all life processes. It takes 20-40 seconds to 1-2 minutes.

Clinical death is a condition when all external manifestations of life disappear. The victim may experience it unexpectedly, without previous manifestations of dying. From 3 to 5 min.

Biological death is a non-reversible process in all organs and tissues of the body (corpulent stains, spin, low temperature) [4, p.10].

The main signs of clinical death:

- Stop breathing on their own
- Lack of pulse in the carotid arteries
- Enlargement of the pupils
- Absence of consciousness

Indications for CPR (cardiopulmonary resuscitation):

- ✓ Clinical death
- ✓ Biological death

Returning a patient to a full-fledged life from a state of clinical death is possible only with a qualified and successful complex of reanimation measures [3, p.2].

1 Stage. Renewable (elemental life support)

- A. ensuring the passage of the respiratory tract
- B. execution of artificial ventilation of lungs of mechanical ventilation
- C. underarm of artificial blood circulation

2 Stage. Medicinal therapy

3 Stage. Prolonged life support.

- A. an estimation of the patient's condition
- B. restoration of brain functions
- C. rehabilitation therapy.

Due to all these points, the issue of deontology in the department of intensive care and intensive care is extremely important [2, p.81].

In the work of the medical staff of the intensive care unit there are often problems of ethical and deontological nature, which is connected with the specifics of work in this field. Indeed, cases that occur in emergency medicine, in particular in resuscitation, are often unpredictable and often fatal. A well-known aphorism sounds "Live means to die." Already in the birth of life laid the genetic mechanism of death. The Latin proverb "Memento mori" (remember the death) has a profound philosophical meaning. Death always remains a kind of majestic and awe-inspiring mystery to a man - no matter how much people knew about it, no matter how much is read, heard or encountered, it can't be seen. Often, the cause of death is illness [1, p.9]. Physiological death in nature is rare, as a rule, doctors deal with pathological death. Tragedy for family and relatives carries the sudden death of a person at any age. In that case medical staff should be prepared for having tough times telling relatives about the condition of the patients.

Conclusions. Response time of emergency medical services contributes to the chance of survival following out-of-hospital CPR in patients with chronic health conditions. Situations that arise in quadrangles (the doctor-sister-patient-relatives of the patient) bear the imprint of drama associated with a real threat to human life. On the one hand, the mental and physical load that lies on the shoulders of the medical staff is high: they face the task of acting clearly and professionally in the maximum compressed segments of time. On the other hand, the relatives of the patient are under the burden of waiting for the death of their loved one, so it is justified to bring high requirements to medical personnel. In respect of each other, employees should remember that there is no special division of responsibility for action, misconduct for different categories of specialties (doctors and sisters), everyone is fully responsible for their actions (or without action) in accordance with their official duties. Attempts to shift the blame to another - the wrong path. Man is by nature mortal, and this is first tragic beginning.

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INNOVATIONS THAT WILL SOON BECOME A REALITY

Medicine is one of the most conservative professions. But more and more innovative technologies are being introduced into daily clinical practice, radically changing the approach in the diagnosis and treatment of many diseases.

1. Broadband Medical Radar for Breast Cancer Diagnosis

Mammography - one of the most common screening technologies for detecting breast cancer can go away in the past. This technique is one of the forms of X-ray. The device is switched on and breast tissue is exposed to low-dose ionization irradiation.

The main drawbacks of the technique are its relative high cost and the harmful effects of radiation on the patient and the medical staff.

Scientists believe that cumbersome mammography in the near future can replace the medical radar, which uses radio waves instead of ultrasound or rigid radiation. Electromagnetic waves of a similar range are emitted by a microwave oven or mobile phone.

This is a simple and fast procedure that takes a few minutes. Scan of the mammary gland is performed by radio waves at frequencies from 4 to 10 GHz.

In addition, the economic benefits of the new methods should be noted. The digital X-ray mammography costs a quarter of a million dollars, while the radar price is one tenth of a million.

2.3-D printer for biological tissues

Just imagine - a full-function kidney, created from its own cells of patients.

At the initial stage, a colloidal mixture of patient cells is created. Then the cells are deposited on a stroma (base), on which a layer on a layer forms a biological tissue or organ. At the last stage, the tissue is incubated until the body or part of the body becomes viable.

At the end of 2016, one company already presented the created liver tissue, which was successfully implanted for an experimental animal.

More realistic prospects are the wide introduction of blood transplants, muscle patches on the heart and nerve fibers. Printing tissues from the patient's own cells will create ideal conditions for the development of transplantation medicine.

3.S.M.A.R.T. sensors and S.M.A.R.T. scalpels

S.M.A.R.T. sensors and scalpels are intended for detection and removal of different types of tissues. The main objective of this technology is: using microsurgery, to treat cerebral aneurysms, to create anastomosis of blood vessels, to remove brain tumors, etc.

Great success in this area was achieved by the Livermore National Laboratory, Massachusetts Institute of Technology and Sandia National Laboratory.

Livermore developed a sensor that can distinguish between healthy and cancerous tissues. Optical, electric, and chemical sensors on the sensor tip make it possible to see a clear difference between different fabrics.

The smart scalpel, developed in the Sandia Laboratory, has a size of 10 cent coins and has the working name "biological microcoagulant laser". Investigation of tissue, cut line and vascular pattern is carried out using optical reflex spectroscopy. Removal of malignant tumors is carried out by a laser.

4.Electromagnetic acoustic visualization

The new diagnostic method is based on the combined use of high-frequency electromagnetic waves and acoustic radiation. During stimulation, different tissues react differently. Each layer of biological tissue vibrates with a unique frequency, and this frequency can be captured by an ultrasonic sensor and converted into an image.

The conductivity of the cancerous tumor is 50 times greater than that of normal tissue. In addition, electromagnetic energy has a greater penetrating power than ultrasound and light. This makes electromagnetic acoustic imaging an excellent method for diagnosing tumors, regardless of their localization. The technology is quite safe, economically beneficial and can detect tumors up to 2 millimeters in diameter.

5. Treatment of stroke with nanorobots

The reason for stroke is blockade of blood vessels that deliver fresh blood and oxygen to the brain cells. Lack of oxygen leads to the rapid death of neurons. Nanotherapy, the treatment of the causes of the disease at the molecular level, is already used in the treatment of infectious diseases and oncology. Now, researchers are planning to create nanorobots that will break the blood clots and deliver medicines directly to the stroke area.

Scientists are studying the possibility of creating nanorobots that would be covered with tissue plasminogen activator, the most effective solvent of blood clots. Specialists believe that nanorobots for the treatment of stroke can appear in clinical medicine after 2 - 3 years.

Today, medicine is on the verge of introducing several exciting technical innovations. New miniature S.M.A.R.T. technologies open a qualitatively new level of diagnosis and treatment of many diseases.

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INFORMATION TECHNOLOGY AND MEDICINE

Information technology has made significant contributions to our world, namely in the medical industry. With the increased use of electronic medical records (EMR), telehealth services, and mobile technologies like tablets and smart phones, physicians and patients are both seeing the benefits that these new medical technologies are bringing [1].

Medical technology has evolved from introducing doctors to new equipment to use inside private practices and hospitals to connecting patients and doctors thousands of miles away through telecommunications. It is not uncommon in today's world for patients to hold video conferences with physicians to save time and money normally spent on traveling to another geographic location or send health information instantaneously to any specialist or doctor in the world.

With more and more hospitals and practices using medical technology like mobile devices on the job, physicians can now have access to any type of information they need – from drug information, research and studies, patient history or records, and more – within mere seconds. And, with the ability to effortlessly carry these mobile devices around with them throughout the day, they are never far from the information they need. Applications that aid in identifying potential health threats and examining digital information like x-rays and CT scans also contribute to the benefits that information technology brings to medicine.

Improving quality of life is one of the main benefits of integrating new innovations into medicine. Medical technologies like minimally-invasive surgeries, better monitoring systems, and more comfortable scanning equipment are allowing patients to spend less time in recovery and more time enjoying a healthy life [3].

The integration of medical equipment technology and telehealth has also created robotic surgeries, where in some cases, physicians do not even need to be in the operating room with a patient when the surgery is performed. Instead, surgeons can operate out of their “home base”, and patients can have the procedure done in a hospital or clinic close their own hometown, eliminating the hassles and stress of health-related travel. With other robotic surgeries, the surgeon is still in the room, operating the robotic devices, but the technology allows for a minimally-invasive procedure that leaves patients with less scarring and significantly less recovery time.

Here are five emerging technologies to watch in the year ahead—and please visit AABME.org for up-to-the-minute developments on the field of bioengineering:

1. Cutting Back on Melanoma Biopsies

With the most deadly form of skin cancer, melanoma, a huge number of dangerous-looking moles are actually harmless, but has always been impossible to know for sure without an invasive surgical biopsy. Today dermatologists have new help in making the right call — a handheld tool approved by the FDA for multispectral analysis of tissue morphology. The MelaFind optical scanner is not for definitive diagnosis but rather to provide additional information a doctor can use in determining whether or not to order a biopsy. The goal is to reduce the number of patients left with unnecessary biopsy scars, with the added benefit of eliminating the cost of unnecessary procedures. The MelaFind technology (MELA Sciences, Irvington, NY) uses missile navigation technologies originally paid for the Department of Defense to optically scan the surface of a suspicious lesion at 10 electromagnetic wavelengths. The collected signals are processed using heavy-duty algorithms and matched against a registry of 10,000 digital images of melanoma and skin disease. [5]

2. Electronic Aspirin

For people who suffer from migraines, cluster headaches, and other causes of chronic, excruciating head or facial pain, the "take two aspirins and call me in the morning" method is useless. Doctors have long associated the most severe, chronic forms of headache with the sphenopalatine ganglion (SPG), a facial nerve bundle, but haven't yet found a treatment that works on the SPG long-term. A technology under clinical investigation at Autonomic Technologies, Inc., (Redwood City, CA) is a patient-powered tool for blocking SPG signals at the first sign of a headache. The system involves the permanent implant of a small nerve stimulating device in the upper gum on the side of the head normally affected by headache. The lead tip of the implant connects with the SPG bundle, and when a patient senses the onset of a headache, he or she places a handheld remote controller on the cheek nearest the implant. The resulting signals stimulate the SPG nerves and block the pain-causing neurotransmitters. [2]

3. Needle-Free Diabetes Care

Diabetes self-care is a pain—literally. It brings the constant need to draw blood for glucose testing, the need for daily insulin shots and the heightened risk of infection from all that poking. Continuous glucose monitors and insulin pumps are today's best options for automating most of the complicated daily process of blood sugar management – but they don't completely remove the need for skin pricks and shots. But there's new skin in this game. Echo Therapeutics(Philadelphia, PA) is developing technologies that would replace the poke with a patch. The company is working on a transdermal biosensor that reads blood analytes through the skin without drawing blood. The technology involves a handheld electric-toothbrush-like device that removes just enough top-layer skin cells to put the patient's blood chemistry within signal range of a patch-borne biosensor. The sensor collects one reading per minute

and sends the data wirelessly to a remote monitor, triggering audible alarms when levels go out of the patient's optimal range and tracking glucose levels over time.

4. Robotic Check-Ups

A pillar of health reform is improving access to the best health care for more people. Technology is a cost-effective and increasingly potent means to connect clinics in the vast and medically underserved rural regions of the United States with big city medical centers and their specialists. Telemedicine is well established as a tool for triage and assessment in emergencies, but new medical robots go one step further—they can now patrol hospital hallways on more routine rounds, checking on patients in different rooms and managing their individual charts and vital signs without direct human intervention. The RP-VITA Remote Presence Robot produced jointly by iRobot Corp. and InTouch Health is the first such autonomous navigation remote-presence robot to receive FDA clearance for hospital use. The device is a mobile cart with a two-way video screen and medical monitoring equipment, programmed to maneuver through the busy halls of a hospital. [4]

5. A Valve Job with Heart

The Sapien transcatheter aortic valve is a life-saving alternative to open-heart surgery for patients who need new a new valve but can't endure the rigors of the operation. Manufactured by Edwards Life Sciences (Irvine,CA), the Sapien has been available in Europe for some time but is only now finding its first use in U.S. heart centers—where it is limited only to the frailest patients thus far. The Sapien valve is guided through the femoral artery by catheter from a small incision near the groin or rib cage. The valve material is made of bovine tissue attached to a stainless-steel stent, which is expanded by inflating a small balloon when correctly placed in the valve space. A simpler procedure that promises dramatically shorter hospitalizations is bound to have a positive effect on the cost of care. [6]

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THE EFFECTIVENESS OF PROBLEM-BASED LEARNING IN MEDICAL HIGHER EDUCATION IN UKRAINE

This paper is an attempt to describe current methods for assessing the quality of medical higher education using problem-based learning and to suggest some directions for implementing it. The aim of this study was to investigate the effectiveness of problem-based learning as a student-centered approach which can provide students more opportunities for application of knowledge acquired from basic science to the real life situations than traditional lecture-based learning approach.

Having declared the course to European integration as a priority vector of its public and educational progress, including the issues of medical education development, the reforms of higher medical education and health care in Ukraine contribute to find solutions for building a new European standard model of education where students are active learners rather than spectators. Improving the quality and effectiveness of future medical professionals has become an issue of importance as the landscape of national higher education has been facing continuous changes [1]. The quality of higher medical education is essential to the development of modern education connecting the learning and teaching to the “real-world” practice. The purpose is to engage medical students in meaningful enquiry-based learning that has genuine value and relevance for them personally and their communities. The research proves without opportunities to practise and apply new knowledge in a variety of contexts, adaptation and integration of new knowledge will not be achieved.

Problem-based learning (PBL) allows medical students to apply their knowledge in a very practical way. Traditional approaches in teaching concentrate on factual knowledge and memorization, without considering medical students’ applicability in the future professional career, however, PBL focuses on flexible knowledge, improved communication, collaborative skills and self-directed learning skills, and a more enjoyable and motivational process of studying.

PBL is defined as a student-centered teaching method in which participants are allocated in groups of up to 10 persons under non-directive tutors and given tasks or challenges that reflect situations relevant to the working environments they will experience. In this way, the learners are empowered to integrate theory and practice, and apply knowledge and skills to develop a viable solution to the problem [2, 3]

The process of collaboration provokes learners to consider new uses for knowledge with their peers and develop new insights for future application. During the problem-based learning process, medical students also engage critical thinking, leadership, working in peers and other essential 21st century skills. It is generally

recognized that twenty-first century competencies and skills are complex and often challenging to teach. Despite worldwide agreement that learners need skills such as critical thinking and the ability to communicate effectively, innovate and solve problems through negotiation and collaboration, pedagogy has not adapted to address these new challenges

Our research proved PBL students scored comparably or better than traditionally taught groups in clinical skills. Our research included 30 medical students (two groups of 15 students each). For two months, one group was trained with traditional method and another group underwent problem-based learning method on selected subject materials. In each method, a pre-course test at the beginning and a post-course test at the end of each course were given to each group. The questionnaire used in this study as the instrument was composed of 50 multiple choice questions. Two tutors of clinical disciplines, two associate professors took part in the training. Scores obtained from these tests were analyzed. There was a significant difference between the mean scores of post-course exams of the two groups, while no significant difference was observed between the mean scores of pre-course exams of the groups.

The research and our studies prove the effectiveness of PBL pedagogy in preventive medicine education. All things considered, the 'transmission' model is highly ineffective for teaching twenty-first century skills, promoting learner autonomy and creativity is part of the solution.

Our results suggest that problem-based learning of preventive medicine education in Ukraine appears to be more effective than traditional in improving knowledge, attitude and skills.

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TEACHING STRATEGIES FOR THE VISUAL LEARNING

There are many ways to memorize the material. Which one is the best to use? First of all, you should find out what kind of learner you are. Great part of learners finds it easier to memorize information they see, that means they are visual learners, that is why here we are going to study this concept in details.

Let`s start with the definition of Visual Learning Style. It is a way of learning in which information is associated with images. This learning style requires that learners first see what they are expected to know. People with a visual learning style are often referred to as visual learners (further VL).

It is important to realize what VL are, so let`s have a look at some general facts. The first one is as follows: the visual learner remembers 75% of what they read or see. Also demonstrations from the blackboard, diagrams, graphs and charts are all valuable tools for the visual learner. One more thing is that generally, global visual learners will process iconic (pictorial) information before reading the printed text.

In view of all this there are some learning strengths of the VL, and they are as follows:

- VLS remember what they read and write;
- VLS enjoy visual projects and presentations;
- VLS understand information best when they SEE it.
- VLS can remember diagrams, charts, maps well;

In the light of their strong points we can state that there are some learning and teaching strategies for VLS. Let`s find out the Learning Strategies first.

1. Write down things that you want to remember. You will remember them better that way.
2. Look at the person who is speaking to you; it will help you focus.
3. Try to work in a quiet place. Wear earmuffs or earplugs if necessary. Some visual learners do, however, like soft music in the background.
4. If you miss something a teacher says or do not understand, ask politely if they could repeat or explain.
5. Most visual learners learn best alone.
6. When studying, take many notes and write down lots of details.
7. When trying to learn material by writing out notes, cover your notes then re-write. re-writing will help you remember better.
8. Use colour to highlight main ideas.
9. Before starting an assignment, set a goal and write it down. Even post in in front of you. Read it as you do your assignment.

10. Before reading a chapter or a book, preview it first by scanning the pictures, headings and so on.

11. Try to put your desk away from the door and windows and close to the front of the class.

12. Write your own flashcards. Look at them often and write out the main points, then check.

13. Where possible, use charts, maps, posters, films, videos, computer software to study from and to present your work (where appropriate).

One more thing is very important if you are going to work with visual learners, it is the list of Teaching Strategies for the VLs.

1. Provide lots of interesting visual material in a variety of formats.

2. Make sure visual presentations are well-organized.

3. During lessons, ensure auditory learners are in a position to hear well.

4. Make handouts and all other written work as visually appealing as possible, and easily read.

5. Make full use of a variety of technologies: computer, OHP, video camera, live video feeds/close circuit TV, photography, internet, etc.

It is important to mention some features of VLs. The most vivid one is that VL prefers to see words written down and when something is being described, the visual learner also prefers to have a picture to view and prefers written instructions rather than verbal instructions. One more thing is if VL needs to memorize historical events he prefers a time-line or some other similar diagram. Moreover, VL observes all the physical elements in a classroom, so posters play great role for them as well as illustrative material and handouts. If to speak about their notes they carefully organize their learning materials (often in outline form) and enjoy decorating their learning areas. VL always remember and understand through the use of diagrams, charts and maps. Also, they enjoy visual art activities.

Knowing the features of VL makes it possible to help VL to memorize information easier. Here we give some tips.

1. **Highlight your notes.** It means that using colors makes it easier to remember information. Moreover, it is possible to use different colors for different topics.

2. **Convert your notes into Mind Maps.** There are different kinds of mind maps and their function is to illustrate the connections between the concepts and to enable the student to see “the whole picture” and to remember it.

3. **Use graphic organizers.** Put the information in different kinds of tables; organize it according to the topic and your own preferences.

4. **Memorize with pictures.** Use pictures to study difficult topics.

5. **Use flashcards.** Flashcards may be used to learn new terms. Take a piece of paper, write down a term on one side, and on the other side write its definition.

6. **Use a timeline and an outline.** Write down only the most important information; put it into chronological order. The outline should be logically built.

To sum up it should be mentioned that VL need the opportunity to see what they learn, and these methods may help them.

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AUGMENTED REALITY IN HEALTHCARE WILL BE REVOLUTIONARY

Augmented reality is one of the most promising digital technologies at present – look at the success of Pokémon Go – and it has the potential to change healthcare and everyday medicine completely for physicians and patients alike.

By now, it is official: Pokémon Go conquered the world. TechCrunch reported that on the day when the game was launched, it immediately surpassed the daily time usage of Facebook, SnapChat or Twitter by the average iOS user on mobile phones. Tom Curry, a man living in New Zealand quit his job to become a full-time Pokémon hunter. In Central Park, herds of Pokémon Go players almost caused a stampede as they tried to capture a rare type of the imagined animal.

Rafael Grossmann, the first surgeon who performed an operation with the help of Google Glass, told me that Pokémon Go represents the ultimate gamification of an “activity” app, and that he does not think the inventors of the game such as Nintendo expected nor planned this effect in people.

The response is augmented reality (AR) and the rising interest of people in its use. Pokémon Go is made with exactly this technology: the device (in this case your phone) transmits a live or indirect view of a physical, real-world environment which is augmented by computer-generated sensory input such as sound, video, graphics or GPS data. In the future, augmented reality could be a built-in feature in a glass, headset or digital contact lens.

Augmented reality differs from its most known “relative”, virtual reality (VR) since the latter creates a 3D world completely detaching the user from reality. There are two respects in which AR is unique: users do not lose touch with reality and it puts information into eyesight as fast as possible. These distinctive features enable AR to become a driving force in the future of medicine.

At the moment, there are certain hindrances to overcome but Grossmann thinks that AR and VR will be very common in healthcare within the next 3-5 years.

According to Grossmann, the biggest obstacles are related to education, cultural change and acceptance, but the technical obstacles are absolutely temporal and not an issue at all, and cost-related barriers will also disappear in the future.[1]

So, there are the best examples of augmented reality in medicine.

1) Augmented reality can save lives through showing defibrillators nearby

What would you do if a person next to you collapsed suddenly? All kinds of thoughts would rush through your head, and no matter whether you would think of calling an ambulance, a doctor or your mom for help, you would definitely reach for your phone.

And I suggest you to consider downloading the Layar reality browser combined with AED4EU app to your phone next to the basic emergency numbers so the next time you get into a similar situation, you will be able to help more.

AED4EU was created by Lucien Engelen from the Radboud University Nijmegen Medical Centre, The Netherlands. Its users can add places where automated external defibrillators or AEDs are located and this database can be accessed through this new application. Moreover, with the Layar browser, you can project the exact location of the nearest AEDs on the screen of your phone and it would take a minute to find them and help those in need. So augmented reality brings crucial pieces of information to those in need or danger. [2]

2) Google Glass might help new mothers struggling with breastfeeding

It is a matter of fact that Google Glass has the potential to revolutionize healthcare, but to be honest I would have never thought of the possibility of helping new mothers with breastfeeding through this technology.

In 2014, the Melbourne office of an innovation company called Small World conducted a Google Glass trial with the Australian Breastfeeding Association that effectively allowed their telephone counsellors to see through the eyes of mothers while they breastfed at home. Through such a way struggling mothers could get expert help at any time of the day and they did not even have to put down the baby from their arms. By sharing the patient's perspective, consultations get to a new level.

3) Nurses can find veins easier with augmented reality

The start-up company AccuVein is using AR technology to make both nurses' and patients' lives easier. AccuVein's marketing specialist, Vinny Luciano said 40% of IVs (intravenous injections) miss the vein on the first stick, with the numbers getting worse for children and the elderly. AccuVein uses augmented reality by using a handheld scanner that projects over skin and shows nurses and doctors where veins are in the patients' bodies. Luciano estimates that it's been used on more than 10 million patients, making finding a vein on the first stick 3.5x more likely. Such technologies could assist healthcare professionals and extend their skills.

4) Augmented reality can assist surgeons in the OR

Doctors and even patients are aware of the fact that when it comes to surgery, precision is of prime importance. Now, AR can help surgeons become more efficient at surgeries. Whether they are conducting a minimally invasive procedure or locating a tumor in liver, AR healthcare apps can help save lives and treat patients seamlessly.

Medsights Tech developed a software to test the feasibility of using augmented reality to create accurate 3-dimensional reconstructions of tumors. The complex image reconstructing technology basically empowers surgeons with x-ray views – without any radiation exposure, in real time.

The earlier mentioned Grossmann, who was part of the team performing the first live operation using medical VR, told me that HoloAnatomy, which is using HoloLens to display real data-anatomical models, is a wonderful and rather intuitive use of AR having obvious advantages over traditional methods.[4]

5) Google’s digital contact lens can transform how we look at the world

The age of digital contact lenses and retinal implants are upon us and they have great potential in transforming healthcare. Retinal implants might give vision back to those who lost it or grant humans supervision augmenting what we can do. Digital contact lenses could transform both how we look at the world while also revolutionizing diabetes care. Google aims to produce digital, multi-sensor contact lens which will be able to measure blood sugar levels. On the other hand, diabetes care constitutes rather a side feature, while more importantly digital contact lenses will be able to augment reality – for example to turn the page of an e-book by blinking an eye. [3]

Although current devices such as Microsoft HoloLens are far from the “perfect” experience, but there is no reason to believe that we will not get there soon. Thus, the most effective way to get used to this future trend, if we start to educate ourselves and our children.

Parents often complain that their kids are just sitting in front of some screens not learning anything about their environment and themselves, but I do not agree. Minecraft also enhances creativity, develops the way children see the world around them – but in a different way as LEGO. I think that from here, it is only one leap before we reach LEGO with AR where the advantages of building something in the real world might be combined with virtual imagination. This way, our kids would be able to know what real is real, but would also be ready to exploit the opportunities AR can provide us with.

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PREGNANCY AS AN AMAZING PHENOMENON

Pregnancy is the most beautiful period in a woman's life. Once you're pregnant, you are full of joy, hope and anxiety. People shower you with blessings, advices and that extra attention that makes you feel special. You have nine months of real happiness. And at the end of nine months, most women are more than happy to get their new little one out into the world. But sometimes Mother Nature has her own ideas.

The record for *the longest pregnancy* that resulted in a live birth belongs to Beulah Hunter, a 25-year-old woman from Los Angeles. When she delivered a daughter, Penny Diana Hunter, in 1945, the child appeared absolutely normal. This shocked her doctor, who stated that Hunter's last menstrual period had been a staggering 375 days ago. An average pregnancy is 280 days, making this an extra three months that Hunter carried her daughter in the womb. [1]

An Indian woman thought to be *the world's oldest mother* has given birth at the age of 70. With her 79-year-old husband, Daljinder Kaur welcomed a son into the world after two years of IVF treatment. Kaur told, that they had started to lose hope of ever conceiving. She said: “God heard our prayers. My life feels complete now. I am looking after the baby all by myself, I feel so full of energy. My husband is also very caring and helps me as much as he can.”[2]

Lithopedion, or a stone baby: is a rare phenomenon which occurs most commonly when a fetus dies during an abdominal pregnancy, is too large to be reabsorbed by the body, and calcifies on the outside as part of a maternal foreign body reaction, shielding the mother's body from the dead tissue of the fetus and preventing infection. Lithopedion may occur from 14 weeks gestation to full term. It is not unusual for a stone baby to remain undiagnosed for decades, and it is often not until a patient is examined for other conditions or a proper examination is conducted that includes an X-ray, that a stone baby is found.

The longest a woman was pregnant with a stone baby was 65 years. Huang Yijun, of the People's Republic of China, was 92 when she was diagnosed.

Patient was informed that the fetus had died inside her in 1948, but she did not remove it earlier for lack of money. [3]

The youngest mum ever is reported to be a five-year-old girl in Peru called Lina Medina who gave birth to a baby boy by C-section in May 1939. Her father took her to hospital with an abnormal growth to her abdomen and tests found she was seven months pregnant. The father was arrested for incest and the baby survived. Medical history revealed she'd been having regular periods from the age of three. [4]

According to the Guinness Book of World Records, *the biggest baby* ever born weighed 23.12 lb and died 11 hours after birth. The baby was born to Canadian Anna Bates in 1879. [5]

The smallest surviving baby ever born is tiny Rumaisa Shaik. She weighed just 8.6 oz and was only 10 inches long when she was born on September 17, 2004.

Rumaisa and her twin sister Hiba were delivered by C-section 14 weeks early at just 26 weeks' gestation after their mother, Mahajabeen Shaik, developed pre-eclampsia, which caused her dangerously high blood pressure. [5]

A Russian woman who was known only as 'the wife of Feodor Vassilyev' from the village of Shuya, reportedly *gave birth to 69 children* in the 18th century during 27 pregnancies. She popped out 16 pairs of twins, seven sets of triplets and four quadruplets.

Tomas, *the world's first pregnant man*, was born a girl, Tracy Lagondino. The thirty-four-year-old man-mum had a sex change 10 years ago, receiving hormone treatment and getting his breasts removed. He kept his reproductive organs because his wife Nancy had a hysterectomy in the 1980s. [6]

Giving birth and being born brings us into the essence of creation, where the human spirit is courageous and bold and the body is the miracle of wisdom.

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LAPAROSCOPY AND LAPAROSCOPIC SURGERY

The aim of the study was to consider the problems laparoscopy can be used and treat, methods of performing laparoscopic operations, its benefits and drawbacks as well as side effects associated with laparoscopic techniques.

Laparoscopy is a surgical procedure which uses a special surgical instrument called a laparoscope to look inside the body or to perform certain operations. This procedure is also known as keyhole surgery or minimally invasive surgery.

Laparoscopic surgery has been developed over many decades and it is difficult to pinpoint one individual as pioneer of the approach. It was in 1902 that Georg Kelling from Dresden in Germany performed laparoscopic surgery using dogs and in 1910, Hans Christian Jacobaeus from Sweden used the approach to operate on a human. Over the next couple of decades, the procedure was refined and popularized by a number of people. The introduction of the computer chip television camera was a key event in the development of laparoscopy, as the procedure could then be conducted while viewing a projected image of the abdominal contents. [5.]

At first, laparoscopy was only been performed on young, healthy adults, but the use of this technique has greatly expanded. Populations on whom laparoscopies are now performed include infants, children, the elderly, the obese, and those with chronic disease states, such as cancer. The applications of this type of surgery have grown considerably over the years to include a variety of patient populations, and will continue to do so with the refinement of laparoscopic techniques.

A laparoscope is like a thin telescope with a light source. It is used to light up and magnify the structures inside the abdomen. A laparoscope is passed into the abdomen through a small cut (incision) in the skin.

The different components involved in the process of laparoscopy are:

the Light Source. This device is the source of illumination (via Halogen or lately Xenon lamps) and is connected to the laparoscope;

The Insufflator. This is a special device which is connected to a gas cylinder (a CO₂ gas cylinder) and transmits the gas to the abdomen to fill it up and distended it resulting in the abdominal organs being pushed down and a space being created for surgery to be performed.

Camera. This is a special high resolution camera connected to the laparoscope.

Trocar & Cannula . This is a two piece instrument with a sharp component inside a hollow cylinder. The sharp part (trocar) helps in penetrating the abdominal wall and placing the hollow cylinder (cannula) inside the abdomen. The laparoscopic instruments then are introduced through the cannula into the abdomen for performing surgeries.

Laparoscopic Instruments. These special instruments (laparoscopic scissors, laparoscopic dissectors, laparoscopic cautery) are used to perform the surgical procedures. They are thin and long (approx. 33 cm in length)

The Laparoscopic Tower. The above equipment is arranged in a tower inside the Operation Theater (OT)

A laparoscopy may be done to find the cause of symptoms such as abdominal pain, pelvic pain or swelling of the abdomen or pelvic region. Or, it may be done if a previous test such as an X-ray or scan has identified a problem within the abdomen or pelvis [7,c.101].

A laparoscopy enables a doctor to see clearly inside your abdomen. Some common conditions which can be seen by laparoscopy include: endometriosis, pelvic inflammatory disease, ectopic pregnancy, ovarian cyst, appendicitis.

Laparoscopic surgery. In addition simply to looking inside, a doctor can use fine instruments which are also passed into the tummy (abdomen) through another small cut (incision) in the skin. These instruments are used to cut or trim tissues, perform sample-taking (biopsies), grasp organs, etc, inside the abdomen.

Laparoscopic surgery can be used for various procedures. Some commonly performed operations include: removal of the gallbladder (a laparoscopic cholecystectomy); removal of the appendix; removal of patches of endometriosis; removal of parts of the intestines; female sterilisation; treating ectopic pregnancy; taking a biopsy of various structures inside the abdomen. Compared with traditional surgery, with laparoscopic surgery there is usually: less pain following the procedure; less risk of complications; a shorter hospital stay and a quicker recovery; a much smaller scar.

Laparoscopy and laparoscopic surgery are usually done whilst a patient is asleep under general anaesthesia. The skin over the tummy (abdomen) is cleaned. The surgeon or gynaecologist then makes a small cut (incision) about 1-2 cm long near to the belly button (navel). Some gas is injected through the cut to 'blow out' the abdominal wall slightly. Currently, carbon dioxide is the most frequently used gas for this purpose. This makes it easier to see the internal organs with the laparoscope which is gently pushed through the incision into the abdominal cavity. The surgeon or gynaecologist then looks down the laparoscope or looks at pictures on a TV monitor connected to the laparoscope. [6,c.62].

If a patient has a surgical procedure, one or more separate small incisions may be made in the abdominal skin. These allow thin instruments to be pushed into the abdominal cavity. The surgeon can see the ends of these instruments with the laparoscope and so can perform the required procedure. A more recent technique called single-port laparoscopy involves operating through the same incision through which the laparoscope was passed and does not require additional cuts to the abdomen. [3,c.32].

When the surgeon has finished, the laparoscope and other instruments are removed. The gas is let out of your abdomen, the incisions are closed using stitches and a dressing is applied.

As any operation laparoscopy may have some risks. The most common risks associated with laparoscopy are bleeding, infection, and damage to a blood vessel or other organ, such as the stomach, bowel, bladder, or ureters. However, these are rare occurrences. [2,c.31].

After the procedure, it's important to watch for any signs of infection. A patient may experience: fevers or chills, abdominal pain that becomes more intense over time; redness, swelling, bleeding, or drainage at the incision sites; continuous nausea or vomiting; persistent cough; shortness of breath; inability to urinate; lightheadedness.

Robotic surgery. A new stage in the development of laparoscopic surgery is the use of specialized robots, one of the most famous among them is "daVinci".

"daVinci" is a computer-assisted robotic system that expands a surgeon's capability to operate within the abdomen in a less invasive way during laparoscopic surgery. "daVinci" system allows greater precision and better visualization compared to standard laparoscopic surgery. [1] The "daVinci" System allows minimally-invasive surgery to be performed with greater precision and improved functional and cosmetic results. It is expected to reduce length of stay in the hospital, complications and postoperative pain.

The difference with robotic surgery is that the surgeon sits at a computer and uses hand controls to manipulate the robot – rather than holding and manipulating the tools themselves, as with laparoscopic surgery. And the imagery is three dimensional, high definition and magnified – all of which allow for better vision and greater precision.

The other distinguishing factor is that the instruments used for robotic surgery are “wristed” – they move like a hand. This provides greater range of motion and more precision, which can mean less manipulation of tissues, less bleeding and less post-operative pain than with laparoscopic surgery. [4]

Most doctors and patients would agree: minimally-invasive surgery is preferable to open surgery. The decision to perform an operation using a laparoscopic approach is individualized per patient. Certain factors such as a patient's past medical history, prior surgeries and a patient's general health are factors that affect the decision to perform a surgery laparoscopically. Only you and your doctor can decide which is best in your case.

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DISEASES OF THE FUTURE

Nowadays humans suffer from diseases that didn't exist in the past, a trend that will probably continue into the future. A wide range of new disorders, especially related to the latest technologies, may affect us.

Computers, video games, office work, virtual realities, and their lumbering presence, are just some of the elements that have changed the context in which we live and the way we spend our time. Technology has found our new weaknesses and will exploit them.

1. Computerization of the Personality

People who spend many hours in front of a computer, for work or for fun, may experience a computerization of the personality.

The relationship with the computer influences cognitive processes and daily actions of the person affected from this modern disease. People with computerized personalities relate with others in the same way they communicate with the machine. The language, the way of thinking, the decision-making processes reflect information technology methods.

Anxious and impatient, they don't speak much. Long talks bore them, they think people have lost the ability to answer in a concise and clear way. Unambiguous, impersonal, fast, that's the kind of conversation they want.

Yes/No, Proceed/Cancel, Save/Delete, Open/Close are their only possible answers to everyday life situations.

2. Virtual Reality Addiction

Simulations are increasingly more influential, satisfying and meaningful than the reality they are presumed to represent. Virtual reality is introducing us to environments and settings far more compelling than real life. Digital worlds are more and more "real" and blended with our physical world.

VR offers the opportunity to physically interface with friends and colleagues across vast distances, and with a dizzying array of technological features at disposal, it

won't be easy to detach. Once fully immersive VR gets available, it will be difficult for people to engage with reality. Consequently, virtual reality addiction will become a common and serious problem. In the Society of Simulations in which we are living, will we still be able to have genuine experiences?

3. Nature Deficit Disorder

A warning message on videogames packaging advises players to take a break for every hour of activity. Despite that, young people— and some adults – spend hours with their face glued to screen. We are consumed with screens of all types and sizes. Whether it's high-definition TVs, laptops, or mobile devices, we interact with screens more than we do with other individuals. We are spending less time outdoors resulting in new behavioral problems.

Nature Deficit Disorder refers to a hypothesis by Richard Louv in his book *Last Child in the Woods*. Louv says the effects of the lack of nature in today's wired generation lives will be an even bigger problem in the future: "An increasing pace in the last three decades, approximately, of a rapid disengagement between children and direct experiences in nature has profound implications, not only for the health of future generations but for the health of the Earth itself".

4. Nanotech Poisoning

Scientists use to operate on a nanoscale, ranging from nanostructures, nanocircuits, nanocoatings, nanosensors, and more. In the future, medicines will get smarter thanks to nanotechnology, but at the same time, nanotechnological devices infused into the human body could cause serious problems.

Since there is no authority to regulate nanotech-based products at the moment, there are many products that could possibly be dangerous to humans. Poorly designed nanobots could deliver medicines to the wrong area, or act in unpredictable ways. And if their programming goes wrong, they could physically damage tissue, or replicate uncontrollably, leading to an internal catastrophe.

5. Superintelligence Psychosis

To be in step with the times, we'll start to increase our intelligence and boost our cognitive abilities using biotechnologies and cybernetics. Genetic modification could tweak us to be smarter, while neural interfaces might allow us to plug our brains directly into the web. But the acquisition of extreme cognitive abilities could prove to be counter-productive.

Our evolutionarily-calibrated psychologies may not be able to handle such exceptional intelligence. Super smart augmented brains will think too much, causing information overload, anxiety attacks, existential cries, egomania and many other psychosis.

It's easy to blame technology for being so distracting, but distraction is nothing new. If we're honest with ourselves, tech is just another way to occupy our time and minds. If we weren't on our devices, we'd likely do something similarly unproductive.

Personal technology is indeed more engaging than ever, and there's no doubt companies are engineering their products and services to be more compelling and attractive. But would we want it any other way? The intended result of making

something better is that people use it more. That's not necessarily a problem, that's progress.

These improvements don't mean we shouldn't attempt to control our use of technology. To make sure it doesn't control us, we should come to terms with the fact that it's more than the technology itself that's responsible for our habits. Our workplace culture, social norms and individual behaviors all play a part. To put technology in its place, we must be conscious not only of how technology is changing, but also of how it is changing us.

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