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Session work №1

MODERN RESEARCH IN THE FIELD OF ENGINEERING SCIENCES

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M. Artemenko, Master student
Z. Shelest, PhD in Biol., Ass. Prof., research advisor
S. Sukhovetska, Senior lecturer, language advisor
Zhytomyr State Technological University

BOTANICAL COMPOSITION AND THE COMPOSITION OF THE RATION OF THE EUROPEAN ROE DEER

European Roe Deer (S. Capreolus capreolus L.) is the first in number among wild hunting hoofed animals in Ukraine. It is an important consume link in forest biocenosis. The study of the features of botanical composition and the composition of the roe deer diet is a very important both for the organization of hunting industry and for ecological researches.

European roe deer is the only species of roe on the territory of Ukraine; it occupies forest-steppe and steppe zones. Generally, the roe deer lives in the clear forests with big grassy glades and in various deciduous and mixed woods. The roe deer can be met on plains and plateaus covered by the cleared deciduous forests with dense underbrush and glades with motley grass. Meadows, bushes and forests are typical lands for the roe deer.

The ration of the roe deer is very diverse with different composition and different proportions of the components. The composition of the ration depends on the climatic conditions of the region and the season, on the food availability, amount of food, animal population in the habitat, as well on the physiological state of individuals.

Research of the roe deer ration in the forests of Ukrainian Polissia was carried out by the botanical analysis of the undigested remains. The rumen content was washed by running water and analyzed with lens. The forage in the rumen contained about 40 species of vascular plants, as well as mushrooms and fruits.

Some types of ferns and young shoots of ordinary pine undergrowth were identified. 18 families of dicotyledonous class and 3 families of monocotyledonous class (angiospermous species) form the roe deer ration. Species of Rosa family are widely presented in the roe deer ration. Such species as European crab apple (Malus sylvestris), European pear (Pyrus communis) and mountain ash (Sorbus aucuparia) are the most widespread species of Rosa family. The willow family is the second and the most often consumed by the roe deer species. Such families as Ericaceae, Betulaceae, Lamiales are presented in the ration by single species. Perennial herbaceous plants are consumed more often than other representatives of monocotyledonous class. Thus, dicotyledonous are the dominant species in the European roe deer ration. It should be noted that there are essential distinctions in botanical composition of forages when comparing diets of animals of Ukrainian Polissia with animal diets of the Central Chernozem region and East Urals. According to the Russian researchers, the presence of a significant amount of grassy forages was observed. It can be explained by the distinctions in a vegetable cover. The ligneous species prevail on the territory of Ukrainian Polissia. Therefore, it is possible to draw a conclusion that the diet of the roe deer is characterized by species diversity and has a specific variety at the taxonomical level.

Features of the European roe deer ration in the forests of Ukrainian Polissia are defined not only by the botanical composition but by the ratio of components in the diet. The basis of the forage for the roe deer in this region is made by such plants as Aspen (Populus tremula), Oak (Quercus), European blackberry (Rubus nessensis) and Bilberry (Vaccinium myrtillus L.). Depending on the season, the roe deer consumes such species as mountain ash, cowberry, heather, willow, birch and carpet bungleweed. Insignificant part of an average annual ration of the roe deer makes minor forage: raspberry, bog bilberry, hazel, maple, etc.

There are essential distinctions in the ration of the roe deer in autumn, in spring, in summer and in winter. These distinctions are shown when analyzing the consumption of specific seasonal forage. The variety of species in the ration is observed in spring and in autumn. The forage of spring diet is formed by the oak shoots and the aspen shoots, by the winter shoots of bilberry and the leafless shoots of willows. The most rich and various forage is in autumn; it consists of various wild berries, aspen shoots, blackberry shoots, bilberry shoots, acorns, apples and pears. Ramal forage is the major forage in this season. Besides, forest fruits and mushrooms also form autumn ration. Winter-green bungleweed shoots, bilberry leafless shoots, birch leafless shoots, aspen leafless shoots, green pine needles and cowberry shoots form winter ration of the roe deer. Summer ration is characterized by the smallest species diversity. Ramal forage prevails in summer and consists, mainly, of tree shoots and shrubs. Maple and purple moor-grass phytomass is typical forage of the roe deer. Irrespective of the season, the ligneous shoots also prevail in the ration of the roe deer. Thus, we can admit that Polissia roe deer is a typical shoot-eating animal.

Summarizing the research results, we can conclude that the botanical composition and the composition of the European roe deer ration in forest ecosystems of Ukrainian Polyssia significantly differ in species composition and vary depending on the season. The basis of the roe deer forage is formed by lignified shoots of woody plant undergrowth and shrubs.

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V. Bovsunivska, Master student
V. Krasnov, Dr. of Agr. Sc., Prof., research advisor
S. Sukhovetska, Senior lecturer, language advisor
Zhytomyr State Technological University

METHODICAL ASPECTS OF FOREST MANAGEMENT IN THE SE «NARODYCHI SF»

According to the «Forest rehabilitation program», which was adopted by the State Forestry Committee of Ukraine, the survey of forests on their radioactive contamination was carried out in the state forest enterprises of Ukrainian Polissya. Normative documents regulating this survey were the following: «Methodical recommendations for rehabilitation radiation-contaminated forests after accident on Chernobyl NPP» [1], and «Technique for examination radiation-contaminated forests for their further rehabilitation (through the years 2010 – 2015)» [2].

Our investigations were conducted in the SE «Narodychi SF», located in the north-eastern part of Zhytomyr region. Forest massifs of the SE «Narodychi SF» were badlycontaminated after Chernobyl NPP accident. Primary data on forests survey in this state forest enterprise was conducted through the years 1991 – 1992. The survey data obtained by Polissia branch of Ukrainian Research Institute of Forestry and Forest Meliorationin 2011 – 2014 were used during the investigations.

The technique used for the survey of forests through the years 1991 – 1992 was developed considering the allocated money. According to this technique it was necessary to select one separate sample for calculating the value of ^{137}Cs soil contamination density per 100 ha of afforestation (one forest block with the territory of 1 km x 1km).

There are many forest blocks in the SE «Narodychi SF» with the territory less than 100 ha and which weren't investigated after Chernobyl NPP accident. On existing schematic maps such blocks were rated to the same zone of the neighboring block with the maximal density of soil radioactive contamination. The total number of forest blocks in SE «Narodychi SF» is 753.The analysis of survey data through the years 1991 – 1992 (Table 1) shows that only 461 of them were examined; and it

makes 61,2 % of their total number in state forest enterprise. A significant number of them – 292 blocks were not examined.

Table 1

The number of forest blocks in the SE «Narodychi SF» which were examined on ^{137}Cs soil radioactive contamination density (years 1991-1992)

Forestry	Number of forest blocks, units		Share of investigated blocks, %
	Total	Investigated	
Narodychi	101	68	67,3
Zalissia	48	47	97,9
Bazar	162	97	59,9
Davydky	64	47	73,4
Zakusyly	135	64	47,4
Klihschi	137	67	67,1
Radcha	106	71	67,0
Total	753	461	61,2

14 – 21 examined samples of soil within one forest block were selected and analyzed (without taking into account their sizes). Thus, the received materials should be considered as more objective than previous ones. Performed examination showed considerable lower values of soil radioactive contamination density compared to the assumed values considering the radionuclide disintegration (Table 2). It is known that the activity of the radionuclide per unit area should reduce approximately by 50% due to the disintegration of ^{137}Cs and ^{134}Cs (from the moment of accident on the Chernobyl NPP). Thus, the average value of soil radiation contamination density in blocks of Bazar forestry in 2014 year is the following: № 26 – 27,0 % compared to 1991 – 1992 years.; № 28 – 38,8 %; № 34 – 51,3 %; № 41 – 21 %; № 52 – 16,5 %;№ 83 – 8,8 %. Similar results were received while comparing the survey data in different forest enterprises. Similar results in the survey of the assumed values and factual data are observed only in some cases (forest block № 34 of Bazar forestry and № 73 of Klischi forestry). At the same time, the reduction of the levels of soil radiation contamination in the forest block № 56, Bazar forestry, is not observed. As far as approximately 20 soil samples in 20 forest stratumof this forest block were analyzed during the examination in 2014, the data of the previous examination in 1991 – 1992 years should be considered as quite subjective.

Table 2

The comparison of the density of soil radiation contamination by ^{137}Cs in forest blocks of Bazar forestry, the SE «Narodychi SF» (based on materials of investigation in 1991 and 2014)

Forestry	Number of forest blocks, units	Number of measurements in 2014, units	Density of soil radiation contamination, (Ci/km^2)	
			Data, 1991 year	Data,2014year
Bazar	26	19	23,0	6,2 ± 0,34
	27	20	-	6,23 ± 0,33
	28	21	16,3	6,33 ± 0,30
	32	16	-	5,79 ± 0,49
	34	17	14,2	7,29 ± 0,35
	41	14	11,5	2,49 ± 0,19
	48	20	-	1,99± 0,17
	52	18	10,5	1,73± 0,08
	56	20	2,7	2,72± 0,16
	83	14	22,9	2,02± 0,19

In general, analyzing the data of the conducted researches on radioactive contamination of forests (the SE «Narodychi SF», Bazar forestry) it can be proved that the value of density of soil radiation contamination reduced much more than 50% on these territories in 2014 year compared to 1991 (Fig. 1).

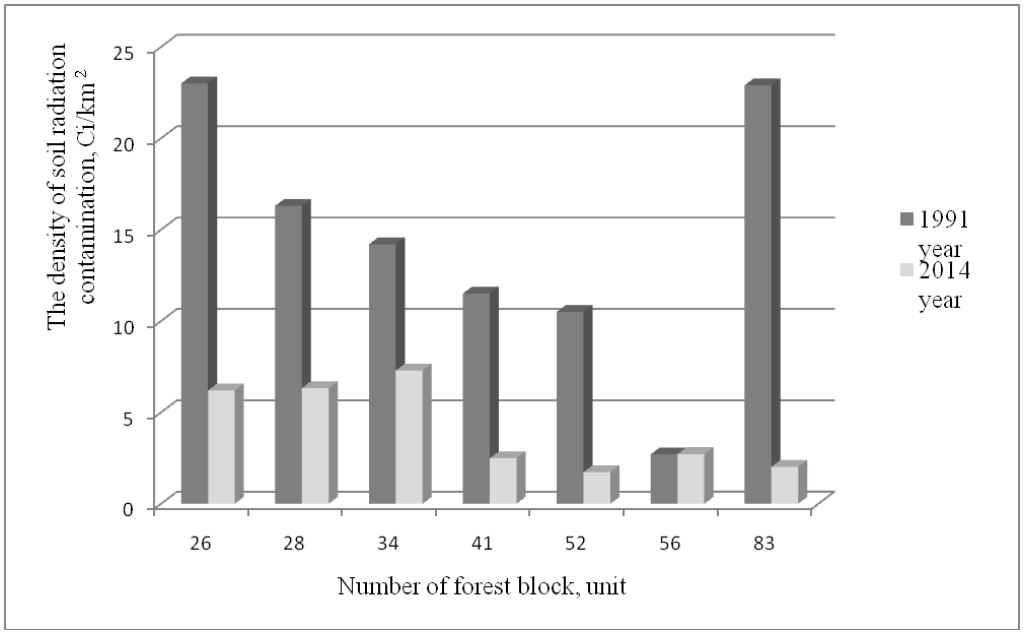

Fig. 1. The dynamics of the density of ^{137}Cs soil radiation contamination in forest blocks of Bazar forestry, the SE «Narodychi SF»

Conclusions:

1. The researches conducted in forest plantings of the SE «Narodychi SF» indicate considerable mosaic character of radioactive contamination at the level of forestry and forest blocks (the excess of the maximum values of the density of soil radiation contamination compared to the minimal values can be by 71 times).

2. It is necessary to examine those forest blocks which were not examined on the density of soil radiation contamination in 1991 – 1992 years for their further rehabilitation and for the restoration of forest management.

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O. Bruzda, Master student
T. Yelnikova, PhD in Technical Sciences, Prof., research advisor
N. Kurnosova, PhD in Phil., Ass. Prof., language advisor
Zhytomyr State Technological University

FEATURES OF EUTROPHICATED PROCESSES IN RESERVOIRS FOR ECONOMIC AND HOUSEHOLD USE IN ZHYTOMYR REGION

Eutrophication is the ecosystem response to the addition of artificial or natural substances, mainly phosphates, through detergents, fertilizers, or sewage, to an aquatic system. One example of this is the "bloom" or great increase of phytoplankton in a water body as a response to increased levels of nutrients. Negative environmental effects include hypoxia, the depletion of oxygen in the water, which may cause death to aquatic animals.

The purpose of my study was to determine peculiarities of phytoplankton formation and development, as well as methods of finding quantitative and qualitative indicators of eutrophication in the reservoir of "Denyshi" and the water intake of "Vidsichne". The overregulation of reservoirs, sewage from the industrial and municipal enterprises, water pollution by fertilizers and pesticides, contamination wastes and many other factors determined specific conditions for structure and production formation of the phytoplankton. The problem of water resources protection in the Zhitomir region is extremely urgent nowadays.

The phytoplankton in the reservoirs under our consideration was examined and found to be presented by diatoms, green, blue-green, euglenophyta, golden and the dinoflagellata algae. In these reservoirs we observed four types of algae: blue-green algae (76%), diatoms algae (14%) and green algae (10%).

Euglenophyta, golden and dinoflagellata occur in the habit in small neglible quantity. They are found only during certain periods of year: euglenophyta - in May and June, dinoflagellata - in July, September and November, golden algae- in April, June, September and November. Therefore they have no crucial importance in the habit.

During 2012, 2013 and 2014 the reproduction intensity of certain phytoplankton forms was different. Let us consider seasonal dynamics of phytoplankton development.

The recurrence is usually observed in reservoirs with limited water exchange and is caused by algae diatoms domination during all the vegetative period. Then they are replaced by blue-green algae in the second half of summer. When it gets cold diatoms algae begin to develop.

The study of the dissolved oxygen content in water showed its decrease during the period of blue-green algae growth (April-October) (fig.1). We also observed an insignificant reduction in quantity of diatoms and an increase in green algae quantity. So, we can conclude that the blue-green algae were the main source of the reservoirs pollution in summer.

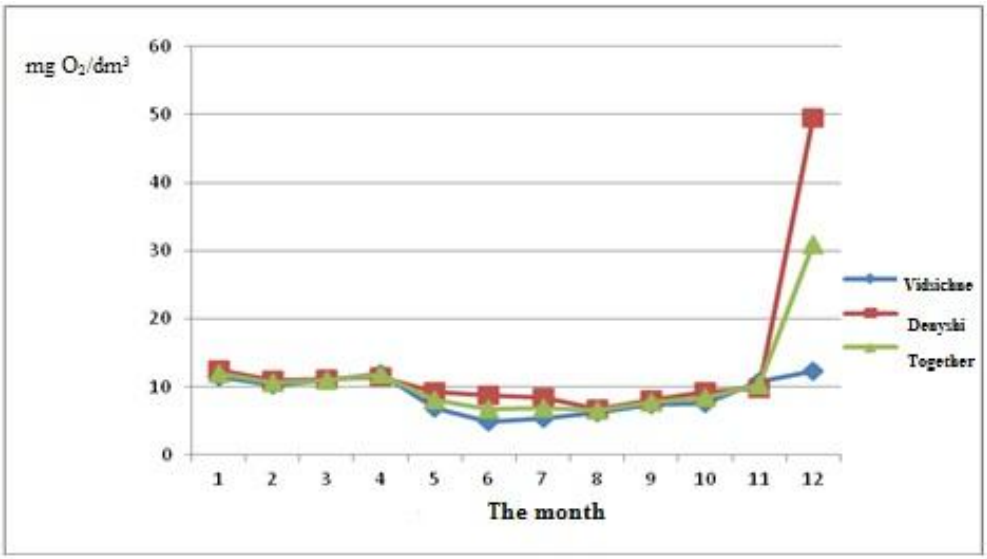

Fig. 1. Concentration of the dissolved oxygen in the reservoirs for three years

The dissolved oxygen decrease in both reservoirs began in April. In June there was a sharp reduction in soluble oxygen to 4,95mgO_2/dm^3. In "Denyshi" the minimum concentration of the dissolved oxygen was observed in August, when it reduced to 6,72 mgO_2/dm^3. At this time the quantity of blue-green algae began to increase. Such a decrease in the content of the dissolved oxygen in both reservoirs lasted till September. Then its content began to increase gradually. In December it reached the maximum amount.

The study shows that the less dissolved oxygen is available in water, the greater amounts of algae can be observed and the more intensive eutrofication is. The

intensity of phytoplankton growth in the water intake of “Vidsichne” is higher than in the reservoir of “Denyshi”.

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O. Byrko, Master student
P. Melnychuk, D.E., Prof., research advisor
I. Melnychenko, lecturer, language advisor
Zhytomyr State Technological University

THE USE OF SUPERHARD MATERIALS IN MECHANICAL CUTTING

The main goal of modern engineering is manufacturing the highest quality products as quickly as possible with minimal capital investment, att he same time accompanied by a constant increase in the complexity of geometric forms and details, their accuracy, high demand son surfaces and their properties, efficiency of assembly products and their operating conditions.

To meet the requirements for the finished product of engineering industry we need to find completely new solutions and ideas fori mprovement and introduction of new production facilities:manufacturing equipment and tooling.

One of the best examples of finding new ideas and solutions and their practical application is the synthesis of superhard materials (SHM).

Diamond synthesis theory was first proposed by O.I.Leypunskym (1939),which is based on experimental data of reverse transformation of diamond to graphite, formulated conditions of the transition of graphite into diamond and calculated equilibrium curve graphite - diamond at high pressures. The synthesis of diamond from graphite at high pressures (more than 4.0 GPa) and temperatures (more than 1400K) carried out in the presence of metallic carbon solvents (Ni, Fe, Co, and others).

Cubic boron nitride is superhard material, which has no natural counterpart. First cubic boron nitride was synthesized in 1956 by "General Electric" at high pressure (over 4.0 GPa) and high temperature (over 1473K) from hexagonal modification of boron nitride in the presence of alkali and alkaline earth metals (lead, antimony, tin, etc.). Cubic boron nitride, manufactured by "General Electric" was named Borazon.

Tool industry produces synthetic superhard materials based on diamond and cubic boron nitride.

In general SHM can be divided into four groups:

1) Synthetic polycrystalline materials based on diamond: АСБ5, АСБ6, АСБР, АСПК1, АСПК2, АСПК3, АСПВ, АСФ, АКМ СКМ, carbonite, diamond, СВ20, СВС, СВБ, СВК, СВПК,

2) Synthetic materials based on polycrystalline boron nitride (SPNB): Composite 01 (Elbor-P), kompozyt02 (belbor), kompozyt09 (PTNB), kompozyt10 (heksanit-R).

3) Composite polycrystalline materials (KSTM): SVAB, PKNB AC, compact.

4) Two-layer composite materials (DSKM) based on diamond: WCT, AMC ATP Diamet, SVBN-1 SVBN-10 SVBN-20 sumydya-200 mehapaks, stratopaks, synpaks, kompaks, polyblok, seropaks-P syndyt, dyatypt.

Accumulated evidence suggests that the use of diamond tools is the most effective on finishing operations in the processing of parts of colored metals and alloys, and polymer composites. The tool can be used for turning discontinuous surfaces and the milling cutter with single and many tines, however, the stability of the tool will be lower than the processing without effort. Treatment can be performed on a frame and passage.

Diamond milling is usually used for the treatment of colored metals and alloys, precious metals, plane and grooves with high demands for flatness. In this case allowance on fine finish is not more than 0,1-0,15mm.

Diamond cutting plates in the processing of polymer composites are also used successfully. The use of cutting plates with mechanical fastening allows increase the resistance in 15 ... 25 times over than with tool from firm alloys and in 2 ... 4 times - from Balas (CRS).

Experience shows that the use of the cutting tool with boron nitride each processed material meets the optimal tool material, that is different to other characteristics of grains cBN (modification, grain size, concentration),ties (material, grain size, physical and mechanical characteristics, etc.),receive mode, etc. For example, amborite is used for continuous and intermittent cutting hardened steel, solid cast iron, castings with hardness 60 HRC; sumiboron BN200 - with continuous and discontinuous cutting hardened and alloy steel and cast iron; composite 01 - at fair treatment of hardened steel and cast iron; composite 10 - with continuous and discontinuous cutting heat-treated steel, cast iron, hard alloys containing 15% Co, surfaced and sprayed coatings, machining steels with austenitic structure.;kiborit - with continuous and discontinuous cutting difficult-heat-treated steels and alloys, cast iron of any hardness, clad materials of martensitic class with high hardness; sprayed materials based FE, Ni, Co, compositions with the addition of hard alloys.

When using SHM in machining together with increase of productivity and quality of the finished product of engineering industry there are a number of issues and questions, which must be addressed for continuous improvement of the competitiveness of manufacturers and meet the growing needs of consumers.

These problems, which arise directly during machining, can be attributed question of wear, vibration, impact fastening methods of cutting plates. These factors affect the deterioration of conditions of cutting and respectively the results of mechanical machining.

To eliminate these factors or reduce their impact a variety of technical solutions are used.

For example to reduce wear of cutting plates with SHM coating is used. To eliminate vibrations comprehensive solutions to improve manufacturing equipment and tooling are essential, so that vibrations occur once in several levels of technological system. To improve vibration resistance in mechanical fastening of cutting plates damping substrate based on colored alloys are used.

The application of the above and the constant search for new solutions can increase the potential of SHM in mechanical machining.

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A. Chumak, Master student
S. Klimenko, PhD in Engr., Prof., research advisor
I. Melnychenko, lecturer, language advisor
Zhytomyr State Technological University

STATE OF THE SURFACE LAYER OF PRODUCTS FROM NON-FERROUS METALS AND NON-METALLIC MATERIALS FORMED DURING DIAMOND MICROTURNING AND POLISHING

The aim of the work is to examine the state of the surface layer inprecision micromachining, technical support of qualities and performance properties of surfaces of products from non-ferrous metals and non-metallic materials.

Processing of products from non-ferrous metals and non-metallic materials, such as semiconductor materials can be effectively carried out by using diamond microturning and polishing is conducted with articles made of sapphire. These technologies provide either work surfaces with extremely high accuracy or ensure the manufacturing of products with high performance in operation. They are associated with the use of special high-precision machine tools and special tools that are equipped with natural diamonds, or work at physical and chemical effects level. This tool wear is one of the reasons for the formation unacceptable stress state and non-treated surface requirements to product operation of a surface layer products.

This work dedicates to the original approach to monitoring and controlling of parameters of the surface layer in terms of microturning and polishing. The data on the mechanisms of the physical condition of the surface layer of products at microturning and polishing is obtained.

The research of contact inter action of cutting tools with details on the state of the surface layer products is conducted; techniques and hardware support for the control of the state of the surface layer in precision micromachining parts made of ferrous metal and non-metal materials are developed; computer modeling of the surface layer in precision micromachining products and comprehensive studies

formation of a blanket of products under different conditions of processing is performed.

The method of tools diagnosis and state of the surface layer in the products in micromachining processes is developed.

The conducted researches enable to optimize technology of micromachining of products with a given optical purposes with a stable set of indicators.

Analysis of the results of research carried out in the direction of micromachining products from metals and non-metallic materials, shows that the goal of the theme set is fully implemented. According to the results of the research technological recommendations for improving precision machining technology finishing electronic products, optics and micromechanics are developed.

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D. Demianuk, étudiant
G. Skyba, Doctorat en sciences technique., Prof., conseiller en recherche
T. Staiulik, prof., conseiller de la langue
L'Université Technologique d'Etat de Jytomyr

LA CHROMATOGRAPHIE SUR COUCHE MINCE ET SON RÔLE DANS LE CONTRÔLE DE LA QUALITÉ DES ALIMENTS

Les produits écologiques sont pertinents dans le monde entier. Notre santé depend de ce que nous consommons. Dans cet article, nous allons considérer l'utilisation de la méthode de chromatographie sur couche mince pour la détermination du DDT dans des betteraves de différents types.

Chromatographie c'est la méthode physico-chimique de séparation et d'analyse des mélanges. La méthode est basée sur la division du mélange entre deux phases - fixe et mobile (éluant). La méthode de la chromatographie a été développée en 1903 par M.Tsvet, qui a démontré que par passage du mélange de pigments végétaux à travers une couche de sorbant incolore les substances individueles sont placées comme les zones distinctes colorées. Tsvet a appelé la colonne de sorbant ainsi obtenue la chromatogramme et la méthode - Chromatographie.

La Chromatographie comme un procédé d'analyse fait partie du groupe de méthodes qui en raison de la complexité des objets comprend la division du mélange original complexe en relativement simple, tel que la distillation, l'extraction, la diffusion ou la combinaison de ces méthodes. Les sépatations par les méthodes chromatographiques sont les plus éfficaces car elles utilisent un grand nombre de types d'interactions intermoléculaires. La séparation de phase dans la couche de colonne ou sorbant chromatographique donne une formule relativement simple, puis analysées par des méthodes physiques d'analyse chimique classique, physique, chimique ou physico-chimique. La chromatographie sur couche mince est une des

méthodes les plus utilisées de l'analyse chromatographique, mais la moins popularisée.

Les principaux avantages de la chromatographie sur couche mince, basée sur le mouvement des éluants (solvant analysé substance) dans une couche de sorbant, à travers des soi-disant forces capillaires, c'est la simplicité et la facilité du procédé chromatographique, l'analyse de haute précision et un coût relativement faible de l'équipement nécessaire.

La chromatographie sur couche mince, avec sa haute sensibilité (détection de seuil bas) et la sélectivité permet de déterminer les substances 10-20 mg à moins de 7%, ce qui est très élevé.

Pour l'analyse Douste solution standard (DDT) a été pris. DDT c'est un exemple classique d'insecticide. Dans des conditions normales c'est une substance cristalline blanche presque insipide et inodore. Son utilisation est interdite dans de nombreux pays parce qu'il peut s'accumuler dans des animaux et des humains. C'est un insecticide de l'action externe, qui cause la mort par le contact externe, affectant le système nerveux des insectes. Il a été choisi, en raison de ses effets néfastes sur l'organisme humain.

Les expériences ont été faites avec des betteraves de trois types:

a) achetées sur le marché;

b) achetées dans le magasin;

c) cultivées dans un jardin privé

10 g d'écrasé de chaque échantillon ont été extraits trois fois pendant 15 minutes sur la machine à secouer par n-hexane par trois portions de 30 ml. Les extraits combinés ont été séchés sur par le sulfate de sodium anhydre, après ils étaient transféré à la machine pour l'extraction, ou le solvant a été conduit à un faible volume.

Laplaque avec de la solution a été placé dans une chambre pour la chromatographie au font duquelle pendant 30 minutes avant la chromatographie a été versé éluant n-hexane. Le bord du plaque avec les solutions peuvent être intégrées dans le solvant mobile pour pas plus que 0,5cm.

Après que le front de solvant s'est levé jusqu'à 10 cm on a retiré la plaque de la chambre et on l'a laissé pendant quelques minutes pour faire évaporer le solvant. Puis on a développé la plaque par un réactif et on l'a soumise à une irradiation UV pendant 10 à 15 minutes. Les plaques doivent être placés à une distance de 20 cm de la source lumineuse.

Sur la couche d'oxyde d'aluminium trois taches gris-noir appparaissent qui correspondent aux trois extraits . Si les taches de l'extrait sont sur la même ligne avec la tache qui a été traitée par la solution standard du DDT, cela signifie que l'échantillon a été traité avec Douste avant la plantation.

Ainsi, sur la couche d'oxyde d'aluminium trois taches de gris-noir appparaissent qui correspondent aux trois extraits. Ils sont aux différents niveaux par rapport à la tache traitée par la solution standard du DDT. Cela signifie que le

contenu de Douste(DDT) dans des betteraves étudiées est absent, cela correspond aux normes, c'est-à-dire ces légumes sont propres à la consommation.

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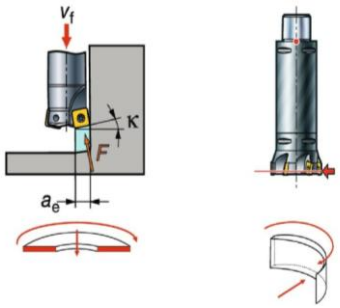
S. Dyakov, student
G. Vygovsky, PhD in Engr., Ass. Prof., research advisor
I. Melnychenko, lecturer, language advisor
Zhytomyr State University of Technology

ANALYSIS OF METHODS FOR PROCESSING FLAT SURFACES BY WIDELY VERSATILE CUTTERS

There are different surfaces in engineering that are processed by mills. Among them are ledges, flat surfaces, pockets, etc. In this regard, there is a problem of high-speed and high-performance machining parts with a large area of metal layer removed.

There are several methods for processing flat surfaces, ledges and surfaces similar in configuration. Treatment of surfaces is mostly performed by face or end mills. For example, case parts, which are flat and the ledge, you need to handle the cutter face (flat surface) and final (ledge). But this method has several drawbacks, namely artificial time increases due to changes in the tool and small processing performance of end mills. Also there are vibrations, noise, high stress in the cutting zone. When processing a number of mills centrifugal force is nearly always present that the processing of complex surfaces do not allow to process the surface without losing performance efficiently and accurately. An important disadvantage is also the fact that in the non-rigid system or in the processing of heavily processed materials (titanium), it is almost impossible to perform processing by end mills with a standard layout.

Therefore the method of processing a number plunger surfaces was developed. When plunger milling processing is carried out not peripheral but the face part of the instrument, the direction of the radial cutting efforts in axial is radically redistributed (see. Figure 1).



Advantages of plunger milling is to use it in the following terms:

- departing tool more than 4 x D mills;
- in non-rigid system;
- while limiting the power and torque of the machine;
- with stringent requirements on the form and relative position of the corners.

So the company Sandvik Coromant has created a number of plunger cutters:

- CoroMill 210 is designed for rough milling with a large offset, size plate is 9mm, tooth loading is 0,1 mm / tooth, the maximum overlap is b = 8mm, diameter cutters is Dc = 25-66mm;
- Coromant F215 is solid processing and has a large diameter and radius, plate size is 25mm, tooth loading is 0,15 mm / tooth, the maximum overlap is b = 22mm, diameter cutters is Dc = 80-160mm
- But plunger milling method is not the first choice for stable processing methods, as it has lower performance. This method is not fully explored and has a great perspective in the future.

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Ye. Dubchenko, Master student
K. Chapska, Master student
S. Bashinskiy, senior lecturer, research advisor
I. Orlovska, lecturer, language advisor
Zhytomyr State Technological University

THE SPECIFICATION OF DIAMOND ROPE TORSIONAL RIGIDITY COEFFICIENT TO REFINE THE PHYSICO-MATHEMATICAL MODEL OF NATURAL STONE SAWING PROCESS

The paper deals with the research in the field of block facing stone extraction and, especially, the work of flexible cutting element – diamond rope – is examined. The executed research is urgent because this type of instrument is widely used only in the last decade.

The research aim is to update the calculation algorithm of the computer model of natural stone cutting process with the help of diamond rope. The research objectives are to determine the torsional rigidity coefficient. For this purpose, the methodology that maximum meets the State Standard 3565-80 “Metals. The torsional test method”.

The phenomenon of lateral input of the rope remains unexplored till now. The study of this phenomenon is caused by the necessity to determine the diamond rope torsional rigidity.

In his papers G. D. Pershin examined the free torsion of unlined steel rope [1]. However he didn’t work out the process of the diamond-rope cutting with polymerized ropes. We have already tested the free torsion of the polymerized diamond rope and found out that the polymerization increases the torsional rigidity

coefficient approximately by 103 percent. That's why it is necessary to carry out the specifying tests and calculations for the polymerized diamond ropes.

Creating the opportunities for more precise selection of rational cutting parameters it is necessary to construct the most accurate model of diamond hob operation in the saw cut that can be do in the Adams program [2],[3]. This program allows getting the numerical values of all nascent forces depending on the set-up initial parameters.

The torsion degree of the flexible instrument in saw cut is determined by the proper rigidity. A great number of experiments should be performed to define the given parameter of diamond rope more accurately. The diamond rope with the diameter of hob 11.5 mm will be tested. The rubbered rope consists of six strands. Parameters will be collected both at torsion and detorsion. The data processing will be represented graphically determining the coefficient of linear approximation.

The law of *Hooke* in the case of torsion can be written down as:

$$\varphi = \frac{M \cdot l}{J_0 \cdot G} \qquad (1)$$

where M is a power moment that causes the torsional deformation;

l is the length of sample;

J_0 is a geometrical polar moment of inertia;

G is the module of fault.

Using the concept of relative torsion angel we will present (1) in the form of:

$$\theta = \frac{1}{H} \cdot M \qquad (2)$$

where H is a coefficient of torsional rigidity, H·m^2; $H = J_0 \cdot G$.

The specified parameters of this coefficient will allow modelling the diamond hob operation in the saw cutting process with high accuracy. By-turn, it will make possible to carry out empiric tests for the determination of optimal parameters of diamond rope cutting. In future, it is possible to create the rational parameters database of the block facing stone extraction with the least losses.

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UDC: 628.16

O. Goretska, student
T. Elnikova, PhD, Ass. Prof., research advisor
S. Kuriata, Senior lecturer, language advisor
Technologische Universität Zhytomyr

DIE ANALYSE UND ÖKOLOGISCHE SCHÄTZUNG DES TRINKWASSERS IM KOMMUNALWERK "ZHYTOMYRWODOKANAL"

In allgemeinen versorgt der Kommunalwerk "Zhytomyrwodokanal" mit dem Wasser die Bevölkerung, die etwas 240 Tausend beträgt, und die Unternehmen deren und Gesamtzahl2153 ist. Außer Zhytomyr versieht "Zhytomyr wodokanal "Trinkwasser mit dem die Siedlungen Zaretschany, Stanischiwka, Sloboda-Seletz, Teteriwka, Perljawka, Kortschak, Deneschi.

Die letzte Neuerung des Kommunalwerks ist die Ausnutzung des Hypochlorit Natriums anstatt des gewöhnlichen Chlors und diese ermöglicht Neuerung das Wasser höherer Qualität zu bekommen.

In der gegeben Diplomarbeit wird Hauptaufmerksamkeit auf die Methode der Reinigung des Flusswassers gerichtet. Die Hauptfragen sind:

Die erste: wie diese Methode funktionieren;

Die zweite: die Reinigungsgrad des Flusswassers am Beispiel des einzigen Betriebes und zwar "Zhytomyrwodokanal";

Die dritte: die Emissionscharakteriskeit, die sich durch den Prozess der Reinigung von Flusswasser gebildet wurden.

Ingenieurökologe dieses Unternehmens beschäftigt sich mit dieser Frage, die für die Qualität des Trinkwassers verantwortlich ist. Im gegebenen Unternehmen wird Tag und Nacht die Qualitätskontrolle der Abwässer und des Trinkwassers in den Behältern durchgeführt. Zur besseren Reinigung des Wassers werden solche Reagenzien genutzt: Valeus (für die Wassersdesinfektion), Hypochlorit Natrium (NaOCl) (für die Entsorgung der verschiedenen Toxinen), Zeolit ($Ca_2/2\ O_2{\cdot}Al_2O_3 \cdot xSiO_2\ yH_2O$) (Mineral für die Absorbierung der schädlichen Stoffen), Koagulat (Aluminiumsulfat– $Al_2(SO_4)_3{\cdot}18H_2O$) oder Flockungsmittel ($[-N^+(CH_3)_2\ (CH_2)_x\ N^+(CH_3)_2\ (CH_2)_y\ -]_n\ 2Br^-$) (für eine bessere Bildung von Niederschlägen).

Für das Funktionieren von Methoden der Reinigung des Flusswassers werden zwei Anlagen benutzt, das heißt, dass der Reinigungsprozess zwei Phasen hat. In der ersten Phase fließt das Wasser durch das Filtergewerbe durch, wo sich das Wasser von den groben, massiven Verschmutzungen reinigt und zwar von Fischen, Alge, Zweige, Lauben. In dieser Phase wird das Wasser mit Waleus desinfiziert. In der zweiten Phase werden zwei Reinigungstechnologien benutzt: die erste ist das klassische zweistufige Reinigungssystem und die zweite ist das einstufige Reinigungssystem.

Das Wasser wird beim zweistufigen Reinigungssystem mit Chlor, Koagulat und Flockungsmittel gemischt. Dann wird das Wasser in die Reaktionskammern angekommen, wo Flocken gebildet werden, die die kleine Partikeln und Bakterien erfassen. In der Kläranlage fallen alle schweren Partikeln in das Sediment aus. Das geklärte Wasser fließt durch die schnellen Filter, die mit Schotter geladen sind. Und endlich wird sich das Trinkwasser zu den Verbrauchern abgegeben.

Bei dem einstufigen Reinigungssystem wird das Wasser sofort durch die Kontaktklärstoffe geflossen ohne die vorherige Kläranlage zu verwenden. Nach der Rekonstruktion des einstufigen Reinigungssystems, werden noch zusätzliche Filtergeräte genutzt. Diese Schnellfilter sind mit Zeolith der verschiedenen Fraktionen geladen (die erste Schicht von 1,3 m mit dem Partikel von 5 bis 60 Millimeter, die zweite Schicht von 0,5 m mit dem Partikel von 1 bis 3 Millimeter). Also es ist klar, dass beim diesen Reinigungssystem die chemische Stoffen überhaupt nicht verwendet werden. Nach der Reinigung wird das Trinkwasser den Verbrauchern eingereicht.

Die Reinigungsqualität des Flusswassers beträgt 99,5% bei der zweistufigen Reinigung, einschließlich alle Reinigungsphasen. Dagegen reinigt das einstufige Reinigungssystem nur 95%.

An den Reinigungsanlagen der zweiten Phase werden sich die produktionstechnischen Abfälle gebildet. Zu diesen Abfällen gehören Schotter, Zeolith und Zeolil, die vielmal verwendet wurden. Die Abfälle, die auf die Reinigungsanlagen gebildet werden, werden in die Bauwerke der ersten Phase ausgeführt und dort zusammengelegen. Dann wird dieses Territorium mit den grünen Pflanzen bepflanzt. An den Kläranlagen der zweiten Phase wird sich das Abwasser filtriert und sich in den Fluss Teteriw geflossen.

Die Trinkwasserqualität gewährleistet das Umweltschutzgesetz der Ukraine. Es gibt nämlich das Dokument über «die extremzulässigen Zurücksetzen (EZZ) des Abwassers und Waschwassers ins Wassersobjekt». Das tatsächliche Abwasserzurücksetzen im Jahr 2013 betrug 85,40 Tausend Kubikmeter/Jahr; 14,60 Kubikmeter/Stunde, die ganz dem bestätigten Verbrauchen vom Abwasser laut der EZZ entsprechen.

Im Vergleich zu dem Reinigungsverfahren des Trinkwassers in anderen Regionen der Ukraine, kann es festgestellt werden, dass das Kommunalwerk "Zhytomyrwodokanal" das modernste Reinigungssystem des Trinkwassers in der Ukraine ausnutzt. Zum Beispiel, in Kharkiw werden drei Reinigungsstufen: Sand-und Kiesfilter, die Chlorierung und die Kläranlagen verwendet, in Odessa werden die mehrstufige Chlorierung ausgenutzt. Zurzeit werden im Kommunalwerk "Zhytomyrwodokanal" Koagulaten und Flockungsmittel (für eine bessere Bildung von Niederschlägen) und Hypochlorit Natrium, das keine kanzerogeneren Stoffe im

Organismus der Menschen als das Chlor bildet, (für die Entsorgung von verschiedenen Toxinen) verwendet.

UDC 621,914

S. Hadaychuk, Master student
V. Loyev, PhD in Engr., Prof., research advisor
L. Mohelnytska, PhD in Phil., Ass. Prof., language advisor
Zhytomyr State Technological University

DESIGN AND TECHNOLOGY PARAMETERS OF NON-STATIONARY CUTTING WHEN PROCESSING BY SINGLE- AND MULTI-BLADE TOOL

Cutting conditions are determined by certain parameters. When one or more of these parameters change their value while removing a layer of material the cutting method is called non-stationary cutting. Therefore, non-stationary processes are the processes that due to changing cutting conditions significantly alter cutting results - processing performance, instrument stability, accuracy and quality of manufactured parts surface.

According to the authors of the project it is better to solve the problem through the development of a special tool with kinematical transformation from circular movement of formative elements. Balancing of cutting forces components can be achieved due to their geometrical parameters. This approach makes it possible to use a non-stationary cutting process even on the machines without CNC.

The problem can be solved through improving machinery structures, equipment and rational choice of materials for their parts. Significant attention is paid to the development of new technological parts formation processes and providing the necessary physical and mechanical properties of the material from which they are made. The task is to improve the design of end mills.

The problem is solved by the fact that due to the shape of the copier according to the dependence $l_x + l_{dc} + d_{bear.} / 2 = const$ (l_x is distance from the center of the copier to the surface; l_{dc} is the distance from the center of the copier to the axis of the bearing; $d_{bear.}$ is bearings diameter that provides a significant increase in tool life, improve the quality and accuracy of processing) circular movement of the cutting element is transformed into a straight, perpendicular to the flow vector. Thus, the path of cutting elements in the process of cutting is shortened. This significantly increases the rigidity of the instrument. In addition, changing cutting angles and cutting speed that occurs when converting circular motion of cutting elements into rectilinear significantly increases the rigidity of the cutting elements. And the fact that springs effort is perceived by a rigid machined copier significantly improves the accuracy and quality of processing.

Terms of machining can be controlled by changing the settings for the load of work surfaces and cutting edges:

- chip formation force;
- nominal and actual contact area;
- coefficient of friction, adhesion and diffusion processes;
- thermal characteristics of the tool material;
- terms of penetration into chip formation zone and on the contact surface of technology environment, etc.

For example, at the stage of designing the instrument you can change the blade loading conditions, i.e. you can decrease normal pressure, maintain the temperature at an optimum level, reduce or increase the time of contact, etc. You can significantly reduce the wear intensity of its work surfaces and the degree of mechanical destruction of the cutting edge and tool breakage probability. All the abovementioned can be achieved through changing the geometric parameters of blades, their number and location depending on the forming and cutting scheme.

Considering the machining from the standpoint of tool blade load allows us to successfully implement an integrated approach at the formalized level (providing the model of the base cutting process) both in solving the problem of predicting its performance under given conditions and in optimizing these conditions depending on the requirements for the processing.

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A. Ischenko, Bachelor student,
K. Kuzmin, Bachelor student,
O. Kravchenko, PhD in Engr., Prof., research advisor
N. Krushynska, lecturer, language advisor
Zhytomyr State Technological University

DETERMINATION OF KEEPING STORAGE PARTS AT CAR ENTERPRISE WAREHOUSE

Keeping the rolling stock of motor vehicle in an efficient condition is provided by the fund spare parts. The size and nomenclature of reserves play an important role of transportation costs. Therefore there is an acute problem in the feasibility of storing parts, components or aggregates in storages of enterprises. Determining of the problem will save the company's resources. Criteria approach of company's work quality indicators can be taken for calculation methodology basis.

To calculate the amount and list of funds of vehicles spare parts there are a lot of methods based on an average mean life, account of various operational factors etc.

New approaches of forecasting spare parts demand are based on hybrid neutral networks with the help of statistical data.

While forming spare parts storage it is necessary to consider the cost of details necessary for routine maintenance and replacement (lubricants, brake pads, batteries, tyres etc.) Therefore the method should take into account limited financial resources available to support the enterprises warehouse of spare parts to allocate these resources for planned repairs and provision of spare parts for unplanned substitutions which principles of determining, nomenclature and quantity are fundamentally different.

One of the main characteristics of motor work transport undertaking is the coefficient of technical readiness of automobile which is defined in detail of *i* type as the relation of time intact work t_{iwork} to the amount of intact work time t_{iwork} and downtime $t_{irepair}$ of automobile taken on some calendar dates.

Due to random nature of these values they are accepted as the average (for all vehicle of this type), values in the expression for the coefficient k_i. Moreover, the readiness coefficient for the entire vehicle *k* is determined on a "weak link", for instance:

$$k = \min_{0 \le i \le n} k_i$$

Previous calculations show that the lack of details in a warehouse can make significant change of availability factor and thus violate the restrictions adopted in practice $k \ge 0,86$. Therefore there is a task to use the criterion that displays the details of the storage type in a warehouse especially as real time of waiting the replacement part may differ from standard.

The example of changes in technical readiness of one hundred and sixty Mercedes-Benz Actros 1844 LS vehicles led us to the conclusions about the feasibility of storing spare parts in stocks.

The results of calculations determining the appropriateness of storage details of the car Mercedes-Benz Actros 1844 LS

Detail	Delivery time, hour	Price, hryvnya	Breakage probability	Expediency
Cylinder sleeves ICE	24	8131,26	0,0000319	Not to save
Thermostat	1	276,72	0,0000536	Not to save
Bearing generator	24	1136,04	0,0000578	Not to save
Pneumatic spring	24	5243,04	0,0000666	Not to save
Caliper brakes	336	30235,56	0,0000531	To save
Injectors	336	16458,72	0,0000587	To save
Brake control module	336	22313,34	0,0000600	To save

EPS block (modulator of gear box)	336	3816,54	0,0000951	To save

Table1

The proposed method can be used in determining the optimal nomenclature and amount of spare parts for motor companies.

UDC 629.113

O. Kalinichenko, Master student
I. Bovsunivskyi, Assistant
I. Vitiuk, Senior lecturer
S. Melnychuk, PhD in Engr., Ass. Prof., research advsor
I. Orlovska, lecturer, language advisor
Zhytomyr State Technological University

COMPUTER SIMULATION OF THE M1 CATEGORY VEHICLE MOTION USING THE SUSPENSION BASED ON FOUR-LINK LEVER MECHANISM

Computer simulation has one of the most important parts to play in the design of cushioning systems at the early stages of design. Therefore, the use of powerful computers to improve or create new, more progressive vehicle systems is an inevitable step.

Of course, simulation can not completely replace physical experiments, its purpose is to ensure the proper definition of the results of experiments with nonlinear systems, interpolate and extrapolate their results. However, the development and breadth of numerical methods application in recent decades has meant that virtual design systems are now the instrument fully integrated in the design process of vehicle and road elements that provide safety.

To achieve the ultimate aim it was decided to develop a full-size model of the car IZH-2715, which would meet all road vehicle operating parameters. As a basic program SolidWorks software with MOTION application that is intended for modeling dynamic systems in the Solid Works environment was selected. Motion is also designed to simulate the mechanism motion taking into account kinematics and power factors. The program is fully integrated into SolidWorks, it operates the SolidWorks geometric model. The record of calculated parameters and results is also carried out in the SolidWorks model.

The program analyzes SolidWorks assembly transforming it into the conventional model of the mechanism taking into account the mass-inertial characteristics of details. These inertial parameters are borrowed from the geometry of the SolidWorks parts and the density (mass) can be designed independently of the geometric shell. Next the system of differential motion equations which is then

solved using retail schemes was constructed for the mathematical model. After that, the program converts numerical results in type available for displaying. At this stage the system interacts with the real geometry again. Displays the estimated kinematic model (as icons) and results are directly displayed in a graphical SolidWorks window at the background of SolidWorks model assembly.

But it is necessary to assign the parameters of the suspension rather accurately to build the quality model (Fig. 1), and they will determine the accuracy and qualityof the displayed results.

Therefore, a lot of laboratory and road tests of the standard suspension of the tested vehicle were carried out. The elastic property was obtained by discrete loading and unloading of the car and the frequency of free oscillations was estimated by the "dumping" method.

According to experimental results the main characteristics of the standard (factory) suspension of the car were obtained that were used to build the base virtual model of IZH-2715 car in the SolidWorks MOTION shell with the basic suspension and the suspension based on four-link lever mechanism (FLLM).

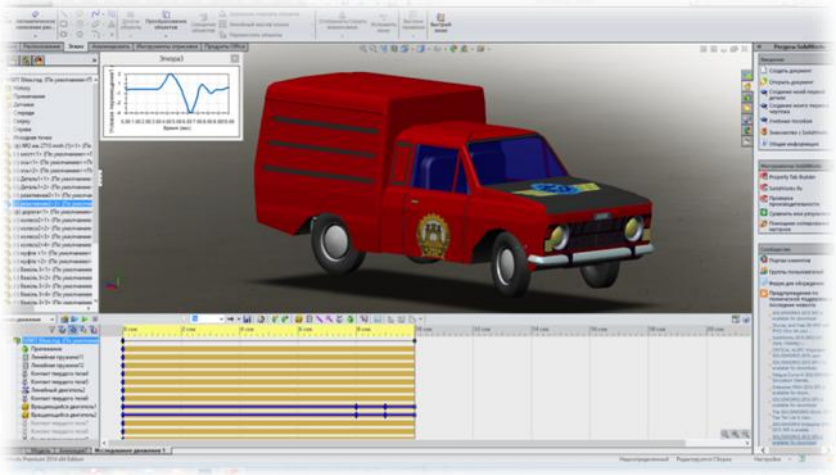

Fig. 1 The purpose of car suspension parameters

These models take into account all the geometrical parameters of the mass of the car and its elements, and the inertia forces, friction in the arms, damping elements, tires friction with the supporting surface, the gravity forces, etc.

The method based on DSTU 52302-2004 was worked out to practice the computer tests of "the evasive maneuver". According to this method the car accelerates to the fixed desired speed and executes "the evasive maneuver" (Fig. 2) without braking and acceleration on the road interval of 20 m and the width of 7 m.

This method allows testing at various speeds with different loading of the vehicle. Testing "the evasive maneuver" at the model of IZH-2715 car with the standar suspension and the FLLM suspension on the road interval of 20m was done at the speed of 50km/h.

Fig. 2 The comparison of “the evasive maneuver” results in computer and road tests

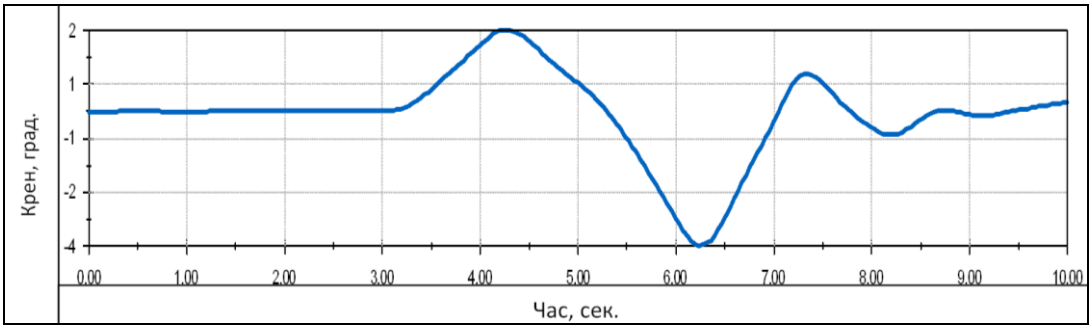

Fig. 3 The roll of car body with the standard suspension executing “the evasive maneuver”

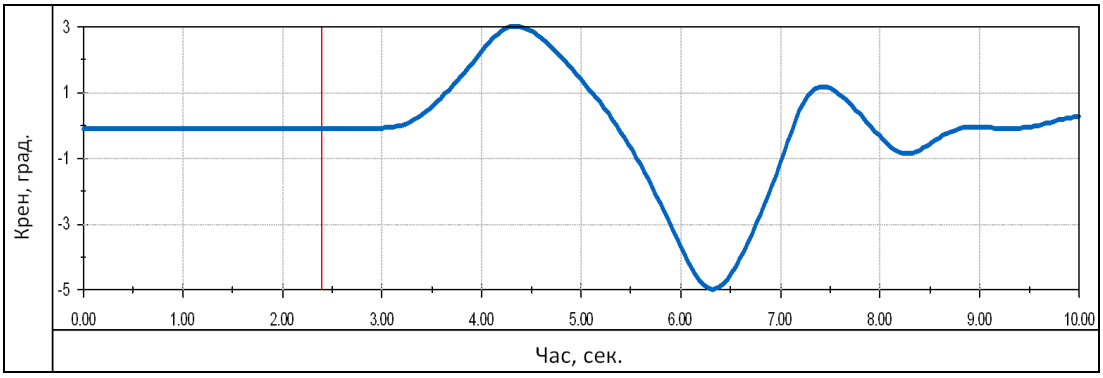

Fig. 4 The roll of car body with the FLLM suspension executing “the evasive maneuver”

Testing “the evasive maneuver” of the same car with the FLLM suspension we found out that the maximum angle of roll was 4 degrees (Fig. 3-4), that was one degree less than with the standard suspension. According to the results of our experiment we can make the conclusion that the vehicle with the FLLM suspension maneuvers more stable in equal conditions.

The next stage is to study the parameters of the IZH-2715 car with the mentioned suspension on the road.

UDC 612.914

V. Karachun, Bachelor student
V. Shumliakivsky, Senior lecturer, research advisor
N .Krushynska, lecturer, language advisor
Zhytomyr State Technological University

IMPROVING ENVIRONMENTAL SITUATION IN ZHYTOMYR CITY BY ORGANIZING RENT OF ELECTRIC VEHICLES

In this work we consider the solutions to problems caused by the transport operation. Emissions of air pollutants from vehicles have increased annually by an average of 3.1%. It should be noted that in terms of environmental damage, transport is the leader in all kinds of negative impacts: air pollution - 95%, the noise - 49.5%, the impact on the climate - 68%. It should not be forgotten about the fact that the transport infrastructure is developing, an increasing number of vehicles on the roads of the city. The program is carried out within the physical limitations of entry into the central part of the city which is full of transport, in order to unload the streets. In order to organize correctly the motion of people and vehicles in the city, it may be offered to limit the motion based on criteria such as: ecology, noise, etc. In Europe, there are emissions standards toxicity vehicles (Euro- 4, Euro- 6).Most of the cars that are currently in operation in Ukraine correspond only to Euro-1, Euro-3. The last but not the least is the question of security, as a large number of vehicles leads to an increased probability of occurrence of road traffic accidents, then the next task is to reduce risk factors.

Focus should be made on electric transport as the cost of an electric vehicle is reduced, they become more affordable. In terms of quietness, the most silent electric cars there, electric motors, are opposed to an internal combustion engine - a bit noisy. Also, electric cars have zero emissions of pollutant substances. First of all, we consider the prospects for the implementation of this program in Zhytomyr city. In the city there is already present the category of electric vehicles, which is presented in the form of public transport: trams, trolley buses, etc. So we can recommend this form of transport in addition to the individual needs of people who move in the city, who are not satisfied with the public transport network. It may be considered the category of people with luggage, with children and disabled people. In order to satisfy partially the demands of people we should havea taxis, which are represented by the electric vehicle, but taxi does not solve the problem to the fullest. To satisfy these challenges completely, we offer rental cars with a high environmental performance. These machines can be hybrids or electric cars.

In large cities the situation is rescued by underground transport as it relieves the external street network, reduces the number of vehicles on the surface, leaving more space for the motion of people. For our city subway construction is not appropriate for several reasons. First is the question of payback, and secondly, our

city has not historically examined, underground corridors are located that may be of archaeological and historical value.

Therefore, we want to provide an easy-to-use city transport structure rent of electric vehicles. Locating city automated points, which are the knots of attracting people. It is sensible to make 6-7 knots related to business centers or public places, entrances to the city, areas of Kroshnya, Bohuniia, Poliova etc. We should add a point near the bus station, taking into account the people who come to your business or any activity and they need to visit the central part of the city. Payment for rent is distributed and covers a variety of bonuses that are associated with the operation of the vehicle, such as permission to enter those areas to which access is forbidden to cars with internal combustion engines, free parking on preferential ground, along with parking spaces for people with disabilities. In Europe free parking was abolished long time ago, and the cost per one hour of parking depends on the city and the region, and varies from 0.5 to 2.5 euro. In Italy, Germany, Spain, the Netherlands, the average price of parking varies from 1 to 2 euro per hour. In Britain, 2 pounds per hour, in US 2-30 dollars per hour. Economic feasibility of using this type of transport will be emphasized only in that situation if the board of the park-place in the city increases.

Renting a car must be registered in the program as a member of the organization you have the opportunity to book a car over the phone or via the Internet at any time convenient for you. Access to the car is conducted by means of a plastic card, which serves as the key. The rent includes cars with a full charge, parking, insurance and maintenance. A very important issue is car maintenance and service parts. That is, when you take the car, you do not have any problems with the fuel, it is already filled up, you do not have any technical problems with the service, since the car is regularly serviced at the station, you are not obligated to return the car, where you got it, you can take advantage of it and you will bring it to the place of attraction. In practice it is needed to consider the types of vehicles that are sufficiently compact and economical, such cars are mostly designed for two people, or two people with children: for example the Fiat 500, Renault Zoe, Renault Twizy, Ford Focus ECOnetic Technology, etc.

In Paris, rental electric cars started in 2009, currently in 3,000 cars per 1,000 points lease. Rental price depends on the duration of the subscription. Access to the system for a year costs 120 euro and gives the right to half-hour access for electric vehicle for rental in 5,5 euro. Monthly access costs 25 euro, but a half-hour rental is more expensive - 6,5 euro. Parisians believe that it is very sensible. In London it costs 12 eur per hour. In China, the cost of renting the machine is universal - 3.25 dollars per hour. Barcelona has the price from 60 euro per day up to 21 euro per hour. Germany, the Netherlands, Canada, the US take 0.41 dollars per minute, depending on the total time of hiring.

Thus we proved there are opportunities to improve the situation in Europe. It is possible to improve the environmental situation, that make life more comfortable.

UDC 621.317, 622.35

N. Karimbetova, PhD student
O. Shapovalova, lecturer
S. Kobzar, Senior lecturer, language advisor
ZhytomyrStateTechnologicalUniversity

MEASURMENT OF THE MOVEMENT PARAMETERS OF ELEMENTS OF DIAMOND WIRE SAW

The measurement of the movement parameters of production equipment is essential for monitoring and controlling the manufacturing process. In this case the production equipment of natural stonemining enterprise was investigated. The modern diamond wire saw Zhongyuan Machinery ZY-45HT was used as the operating equipment.

The physical process of diamond cable cutting can be described as the penetration of a chisel into the solid body. The chisel presses into the rock as a wedge under the influence of the thrust force, and moves simultaneously in the direction of cutting under the impact of cutting force destroying the rock ahead of itself.

The scheme of the working face of the diamond wire saw Zhongyuan Machinery ZY-45HT is shown in Figure 1.

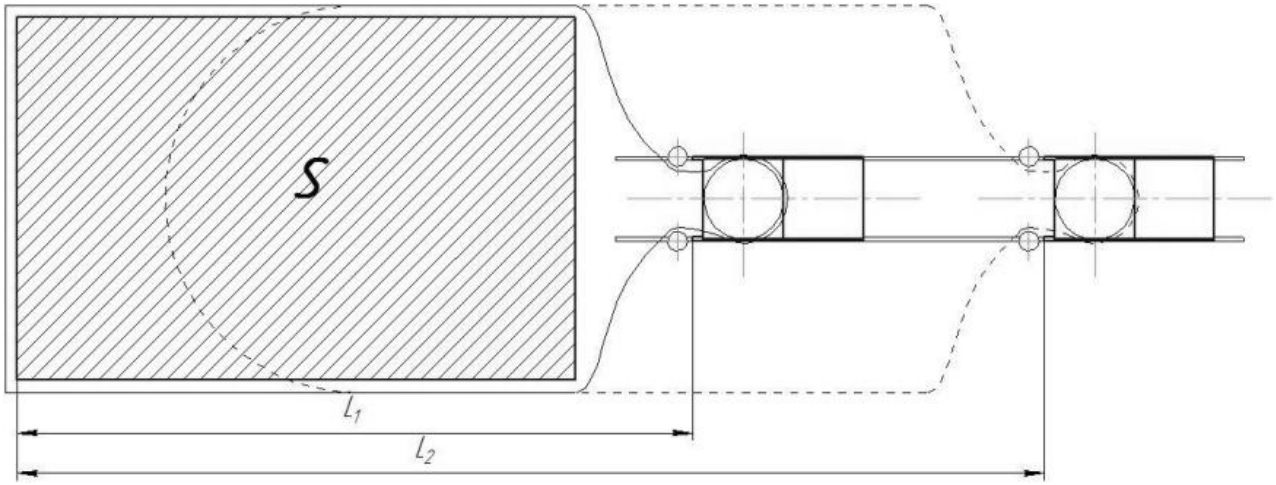

Fig. 1.The scheme of the working face of the diamond wire saw (horizontal cutting)

S - the area of the separable surface;

L_1 - the distance from the farthest point of the monolith to an extreme point on the body of the installation in the initial position;

L_2 - the distance from the farthest point of the monolith to an extreme point on the body of the unit in the final position.

The aim of the investigation of the movement parameters of the diamond wire saw on the rails is the determination of instantaneous cutting productivity with the subsequent determination of total productivity.

The diagram of changing of the coordinate of the diamond wire saw in the course of the experimental period is shown in Figure 2.

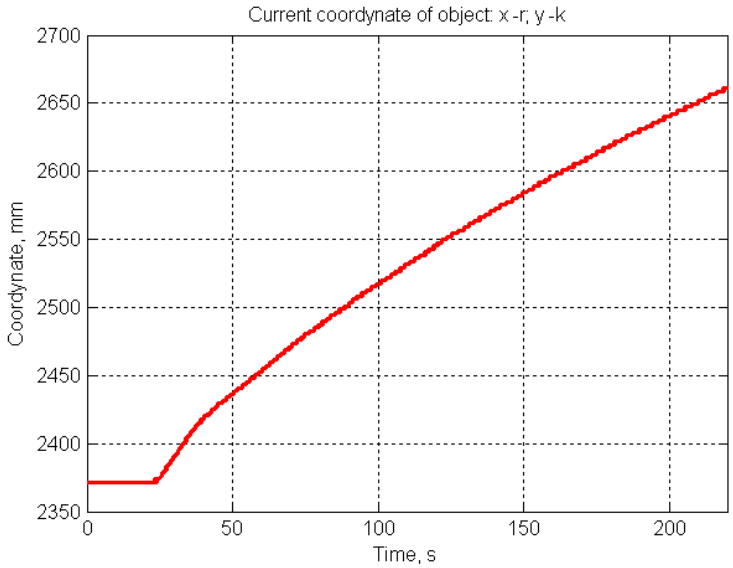

Fig.2. The diagram of the dependence of the coordinate on the cutting duration

Movement parameters data of the diamond wire saw have been gained in the result of the algorithmic processing of video images. On the basis of obtained coordinates it is possible to determine the instantaneous rate of movement of the diamond wire saw on the rails.

The method of the research of movement parameters of the diamond wire saw on the rails using the computer program of video image processing makes it possible to explore the process of displacement of wire saw on the rails in details.

The method of manual measurement of the movement distance using the tape-line doesn`t offer the determination of the movement speed at any point of time in contrast to the suggested method.

The application of the suggested method of video image processing offers the possibility to determine the instantaneous productivity of the diamond cable unit. On the basis of the present coordinates it is possible to forecast the final cutting time and to handle the indices of cutting productivity using the changes of the indices of current and main motor speed of the diamond cable unit.

UDC 599.735.34

D. Karpova, Master student
Z. Shelest, PhD in Biol., Ass. Prof., research advisor
S. Sukhovetska, Senior lecturer, language advisor
Zhytomyr State Technological University

CANCER MORBIDITY CAUSED BY THE ECOLOGICAL SITUATION IN ZHYTOMYR REGION

Economic situation and the quality of the environment influence the health of the population. In recent years the number of patients with various diseases in Ukraine increased by 25%, the total population was reduced to 4 million people. Cancer (onco) morbidity is steadily increasing by 3% per year. The highest cancer morbidity is in Kirovograd, in Mykolayiv and in Odesa regions compared to the average in Ukraine. The lowest morbidity of malignant neoplasms is in Zakarpatia, Volyn, and Chernivtsi.

Today the world's environment is polluted by many harmful substances and chronic exposure of the population by low doses of radiation can not be ignored when assessing the overall morbidity and determining the reasons which cause it. Therefore, there is a question of dose accumulation and evaluation of the impact of radiation on the health of the population. It was established that various harmful biological effects of radiation are caused not only by the action of high doses. Most scientists believe that there is no innocent dose of radiation and even small doses can cause various diseases. Ionizing radiation was determined to act not only as an inducer of carcinogenesis, but also as its accelerator. Therefore, if the first stage of carcinogenesisis induced chemically, the radiation can play the role of "the last drop".

While assessing radiation effects on human health in Zhytomyr region, the carcinogenic effect of exposure was selected as the main indicator of the cancer morbidity. The main artificial sources of people radiation exposure on the territory of Zhytomyr region are the soils contaminated by emissions after Chernobyl accident (radionuclides transported by wind and river washout) and radiation emissions in the process of natural stone extraction. Besides, such medical procedures as X-ray and radio diagnostics can also be the source of overexposure. According to the radiological studies conducted in the region, the average total dose of external and internal radiation exposure is 6,7 ± 2,5 mSv / year. Data of oncology morbidity were taken from materials of the annual health statistics for the period of 2010-2014.

Oncology morbidity

Some indicators	2010	2011	2012	2013	2014
The morbidity (per 100 thous. population.)	307,1	312,0	322,7	332,8	327,8
Advanced (III – IV visualized; IV - for all other localizations.) In%	23,2	26,1	24,5	26,8	26,6
The death rate (per 100 thousand. population)	176,2	182,5	184,1	190,2	194,4
Mortality beforeone year	30,8	30,8	29,2	25,8	27,4

From the above data it can be concluded that the number of cancer patients and the number of deaths per 100 thousand of population has increased over the years. There are a lot of advanced malignancies detected. People visit doctors to diagnose

diseases too late. Unfortunately, it can be due to not only the imperfect system of health protection and bad clinical examination of the population, but also because of the growing rate of malignancies development. In the latter case we can assume a negative effect of radioactive contamination of human habitation.

In 2014 the average malignant neoplasm morbidity for the region was 327.8 per 100 thousand of population. The morbidity of rural population is 295.8 per 100 thousand of population and it is much lower than in town (350.6). Thus, the urban population is much more likely to suffer from cancer than rural. The growth of the mortality of malignant neoplasm is also observed. The greatest mortality per 100 thousand of population is noted in the following regions: Zhytomyr, Volodar Volynsk, Korostyshiv, and Olevsk.

Thus, we can conclude that the malignant neoplasm is one of the most dangerous medical, biological and socio-economic problems that are closely related to the environment. Cancer morbidity and mortality are increasing due to the unfavorable ecological situation and significant population aging. According to the World Health Organization, if the lifestyle of humanity does not come to any changes, by 2030 the number of cancer patients in the world will double in relation to today's indicators and it will be the main cause of people's death.

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Y. Kotkov, Master student
I. Kotsuba, PhD in Engr., Ass. Prof., research advisor
S. Kuriata, Senior lecturer, language advisor
Zhytomyr State Technological University

DIE ANALYSE DER ÖKOLOGISCHEN SICHERHEIT DER VERSORGUNG MIT DEM TRINKWASSER DER ZHYTOMYRER REGION

Heutzutage ist besonders aktuell die Landbevölkerung der Ukraine mit dem Trinkwasser zu versorgen. Nur etwa ein Viertel der Landbevölkerung der Ukraine wird mit dem Trinkwasser versorgt. Gegenwärtig wohnen auf dem Lande mehr als ein Drittel der Bevölkerung der Ukraine, das das Trinkwasser dezentralisiert (das heißt aus den Quellen , wie Hydranten), genutzt wird.

Die Analyse der Dynamik der Gewässerqualität in den dezentralisierten Quellen (und zwar die Flüsse Teteriv, Gujva, Gnylopjat) zeigte, dass das spezifische Gewicht von Wasserproben mit der Vermehrung des Gehaltes von Nitraten sich innerhalb des Zeitraums zwischen 2008 - 2014 in 5,7 Mal vergrößert.

In der gegebenen Untersuchung wird die Zahl der Wasserproben auf das Gehalt von Nitraten erforscht und es wird festgestellt, dass die größte Menge der Proben mit dem übermäßigen Nitratengehalt beobachtet werden konnte. Diese Menge betrug 42,8% (es ist mehr als nimmt die extremzulässigen Zurücksetzen (EZZ) an).

In meiner Wissenschaftsarbeit werden die Zusammenhänge zwischen den Niederschlägen und der Gewässerqualität untersucht. Es werden die Wasserproben in 2013-2014 aus den obengenannten Flüssen gebracht und analysiert. Man soll betont, dass es eine Reihe von Bedingungen und zwar erstens: das Wetter, zweitens: die Charakteristik der grundverschmutzigten Quellen, in denen die Niederschläge filtriert wird, gibt. Innerhalb des Zeitraums zwischen 2010-2014 wird das spezifische Gewicht der Wasserproben mit dem übermäßigen Nitratengehalt in den dezentralisierten Quellen von 39,8% bis 42,3% variiert. Die wenigsten Probenmengen werden im 2013 fixiert und entsprachen der kleinsten Kennziffer der summarischen Zahl von Niederschlägen, etwa 601,4 mm. Während des Jahres 2014 fielen auf 116,5 mm von Niederschlägen mehr als in 2013 aus und als Ergebnis, vergrößerte sich die Probenmenge des Trinkwassers mit dem übermäßigen Nitratengehalt in etwa 1,3 Mal.

Die Besonderheiten der Dynamik der summarischen Zahl von Niederschlägen in der einzelnen Region beeinflussen also wesentlich die Migration der Korelationsverbindung (r=0,92) mit der summarischen Zahl von Niederschlägen und den Wasserproben bestätigt. Es ist sichtbar, dass das Nitratengehalt die EZZ übertrifft.

Das übermäßige Gehalt von Nitraten kann nicht nur bei der Untersuchung von dezentralisierten Quellen, sondern auch von zentralisierten Quellen beobachtet werden.

Die Ergebnisse der Untersuchung in den einzelnen Bezirken des Zhytomyrer Gebiets zeigen die Vergrößerung der Zahl von Nitratenverbindungen im Trinkwasser und nämlich:

Zhytomyr - 182,2 mg/dm^3
Nowograd-Wolynsk - 135,8 mg/dm^3
Owrutsch - 229,3 mg/dm^3
Popilnja - 98,2 mg/dm^3
Ruzhyn - 394 mg/dm^3
Tschudniw - 90 mg/dm^3

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UDC 622.1

L. Kovalevych, lecturer
V. Kotenko, PhD in Engr., Ass. Prof., research advisor
S. Sukhovetska, Senior lecturer, language advisor
ZhytomyrStateTechnologicalUniversity

STATISTICAL ANALYSIS OF MEZHYGIRYA DEPOSITS IN VOLODYMERETS AMBER-BEARING DISTRICT

Most of amber occurrences and deposits in Ukraine belong to the Polissyan (Prypyat) basin which is the part of the largest in Europe the Baltic-Dnepr amber province. The main amber ledges are related to littoral-marine sands of Mezhygirya suite of low Oligocene (the Rupelian stage). Value of Ukrainian amber is in its originality which first of all shows itself in a variety and uniqueness of coloration.

The Volodymyrets district with the Dubivka, Volodymyrets, Vyrka and other inby units is the most prospective in the Ukraine for the discovery of new amber deposits. The deposits of productive layer in overwhelming majority are presented by sandy factions with different-grained material. Mainly within the limits of district's south margin also there are silt-sandy and clayey-sandy Mezhygirya deposits.

Mezhygirya deposits of inby unit are represented by shallow-sea and littoral-sea formations and consist of different-grained, mainly coarse-middle-grained quartz sands with the admixture of glauconite, greenish-darkly-grey, that contain layers strongly clayey sand and clayey aleurites, silty clays dark-grey with the inclusions of lignificated wood and separate amber pieces).

The thickness of productive deposits varies from the first ten centimeters on the slopes of paleo-depressions and on shoals and up to 11.5 м in depressions. The average thickness of Mezhygirya deposits within the limits of shoals makes 1-2m and in ditch–likelinear depressions — 5-7m.Martite in the deposits of sea facies of Mezhygirya time confirms the island structure of Mezhygirya basin of sedimentation. These conditions complicated the character of amber distribution.

Grain amber in a negligible quantity except for the deposits of Mezhygirya suite of Paleogene connected also with the Bereka and Obukhiv paleogene deposits, and also – with Quaternary deposits in area. Commercial amber of the class +5 mm on site is also connected exceptionally with the deposits of Mezhygirya suite of

Paleogene. Coming from above-mentioned, by the basic stratigraphic level of commercial amber accumulation on “Vyrka” site are the Mezhygirya deposits.

For forming of electronic geological database the information which was collected by the specialists of the Rivne geological expedition of State geological survey of Ukraine as a result of prospecting works conducting on amber in a Volodymyrets amber-bearing district was used. The geological structure of deposit is determined on the basis of sampling of the mining holes, the spacing of which within the limits of the explored area made 100x100 m. Except for it, with the purpose of estimation of the amber mineralization in the small fields of productive deposits extension and areas of grain amber dissemination here is also bored out of network, separately placed bore pits. For the changeability study of amber’s ledge within the limits of area on a profile also the bore pits of spacing are bored with distance between them 25 m on average for a driving of research trench.

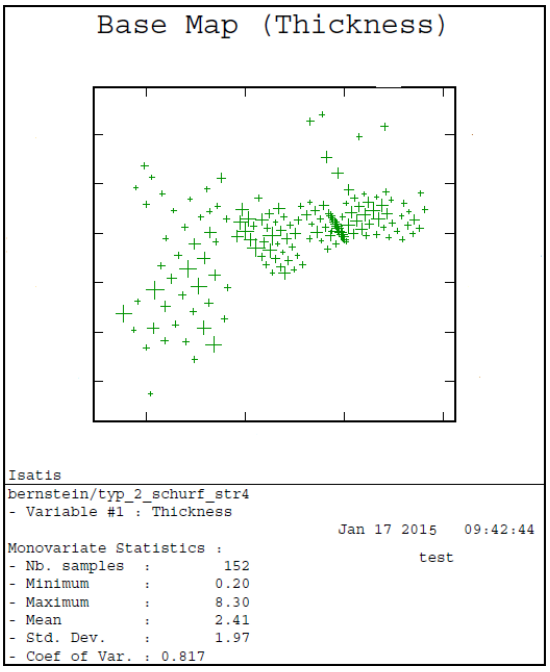

Fig. 1 (a) Base Map of holesnet

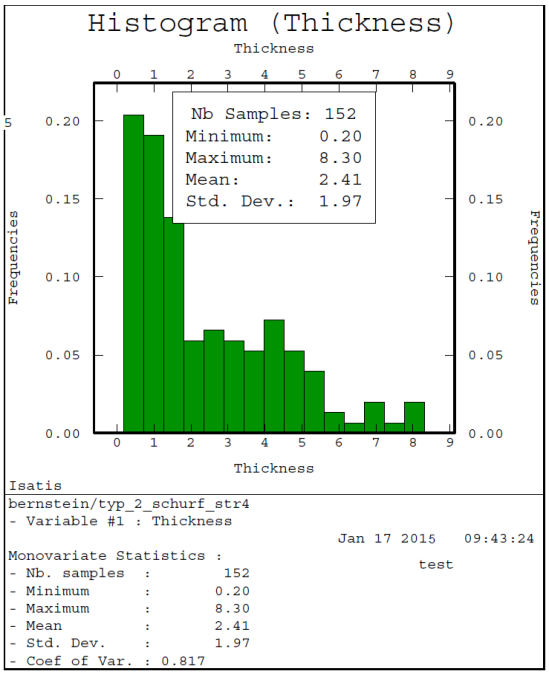

Fig. 1 (b) Histogram of the capacities of Mezhygirya deposits

The base map of holes arrangement on this site is shown in Fig. 1 (a). The capacities of a productive layer are presented in the form of the column histogram in Fig. 1 (b). The column histogram shows the frequency distribution; the height of each column indicates the frequency of the emergence of power values in the chosen range; and the quantity of the columns shows the number of the chosen ranges. Univariate statistics are presented under the histogram: nb. samples, minimum, maximum, both and &.

The important advantage of the histogram is that it allows to visualize the tendency of the measured parameters change of the object quality and to estimate visually the law of these parameters distribution. It is important to determine the law

of distribution as far as it helps to use correctly some mathematical expressions and methods of calculations for data further processing.

Thus, on the basis of the obtained histogram and considering the characteristics of the geological structure of specified layers, it can be concluded that within the sediment basin there were difficult and rather different conditions of sediments accumulation. Consequently, the obtained results are corresponding. It is obvious that a special role plays the hydrodynamics of deposits accumulation. Hereafter, Mezhygirya mountain thickness should be investigated using computer simulation of currents in the basin and hydrodynamic conditions of sediments accumulation considering the types of cuts.

UDC 622.1

V. Kozak, Undergraduate student
L. Kovalevych, Senior lecturer, research advisor
I. Orlovska, lecturer, language advisor
Zhytomyr State Technological University

RESEARCH OF INTERPOLATION QUALITY CHANGING THE ACCURATE DATA OF GEOLOGICAL SAMPLING

The interpolation function is determined by a matrix P of real numbers, whose elements (coordinates)are assigned to nodes of a regular rectangular grid covering the domain D [4]. In geology this task is most often run into constructing the maps of the face of formation based on well-drilling data.

An interpolation/approximation method is sufficiently flexible and robust enough for solving large problems, provides results comparable with the Kriging method (respectively with the Radial basis function method or Minimum curvature method).

The research aim is to explore the productive (Mezhygirya) strata of the southern part of Volodymyrets ambar district with the help of the interpolation method changing the accurate data of geological sampling.

There are a lot of programs that fulfil similar tasks. To solve our problem we used Surfer, because it is quite a common, relatively cheap and easy to learn program. Ordinary Kriging that was used for our interpolation research is included into Golden Software Surfer – one of the most common commercial packages for spatial interpolation.

Surfer is a full-function 3d visualization, contouring and surface modeling package that runs under Microsoft Windows. Surfer is used extensively for terrain

modeling, bathymetric modeling, landscape visualization, surface analysis, contour mapping, watershed and 3d surface mapping, gridding, volumetrics, ets. [3].

Surfer's sophisticated interpolation engine transforms your XYZ data into publication-quality maps. Surfer provides more gridding methods and more control over gridding parameters, including customized variograms, than any other software package on the market. You can also use grid files obtained from other sources, such as USGS DEM files or ESRI grid files. Display your grid as outstanding contour, 3D surface, 3D wireframe, watershed, vector, image, shaded relief, and post maps. Add base maps and combine map types to create the most informative display possible. Virtually all aspects of your maps can be customized to produce exactly the presentation you want. Generating publication quality maps has never been quicker or easier [3].

The thickness of productive deposits ranges from the first ten centimeters on the slopes and in the shallows to 11.5 m in the dips. The average thickness of mezhygiryan deposits is 1-2 m and 5-7 m in the cavities [1].

The geological structure of deposit is determined on the basis of sampling of the mining holes and bore pits set, the spacing of which within the limits of the explored area made 100x100 m and 200x200 m that is compatible with "Instruction of the State Commission on reserves of Ukraine" [2].

We have interpolated the Mezhygirya strata thickness of district part according to the data in mining holes (Fig. 1), bore pits (Fig. 2) and using common data from mining holes and bore pits (Fig. 3) with the cross-sectional height of 1 m starting from 0,5 m bed contour line.

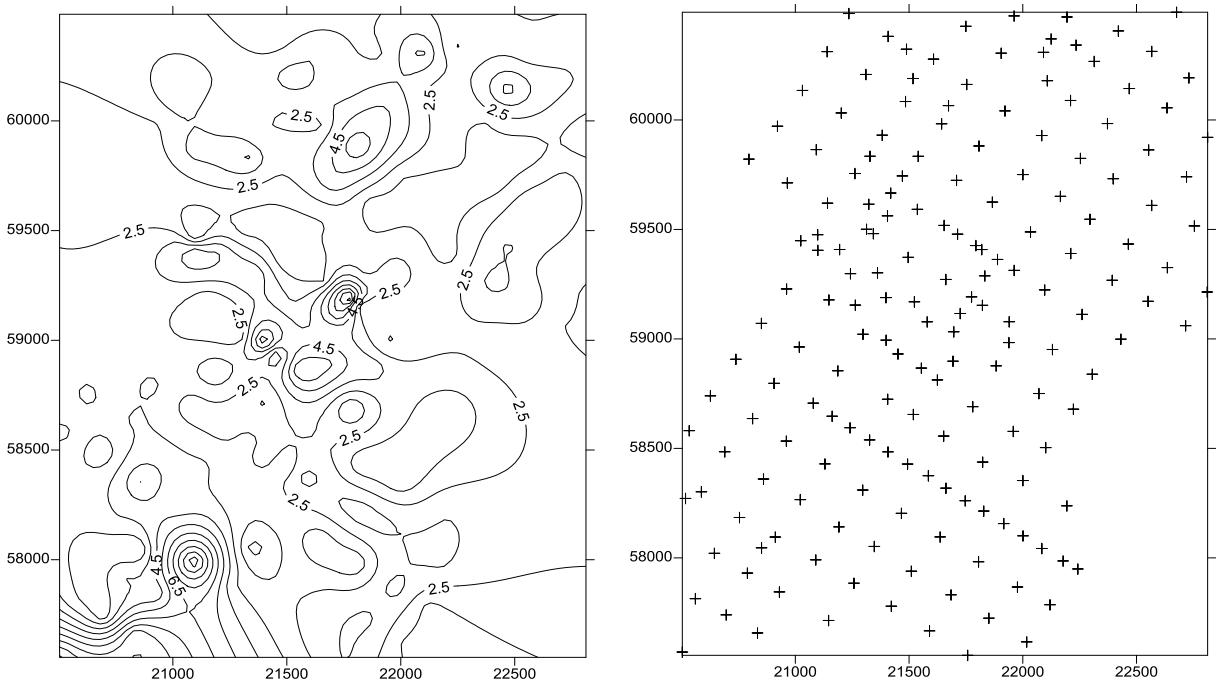

Fig. 1 Interpolation of area according to geological assay data in mining holes

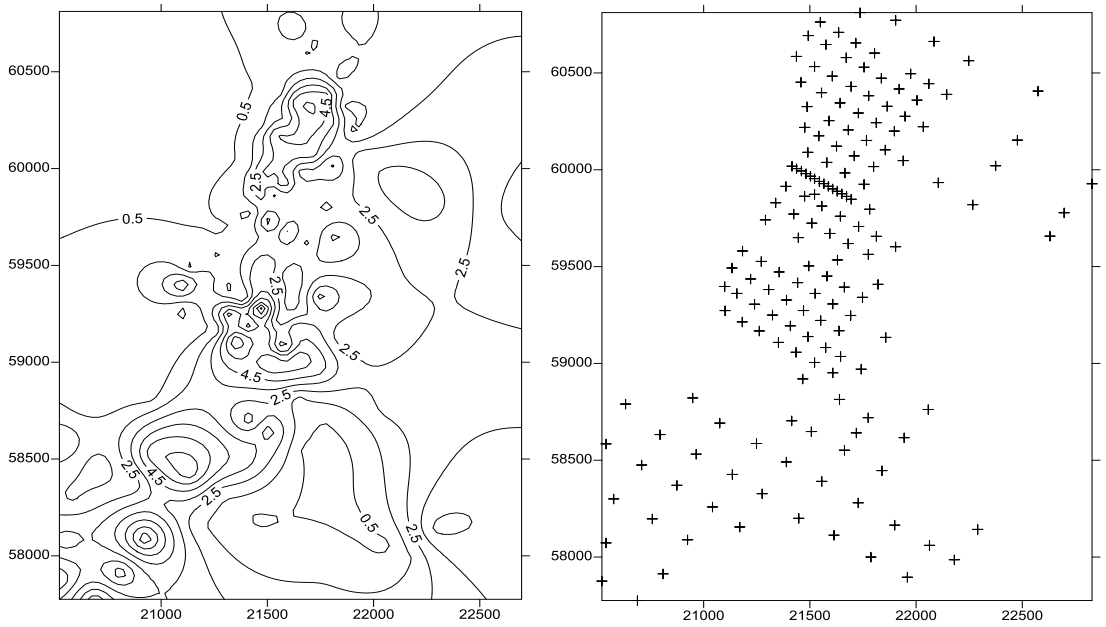

Fig. 2 Interpolation of area according to geological assay data in bore pits

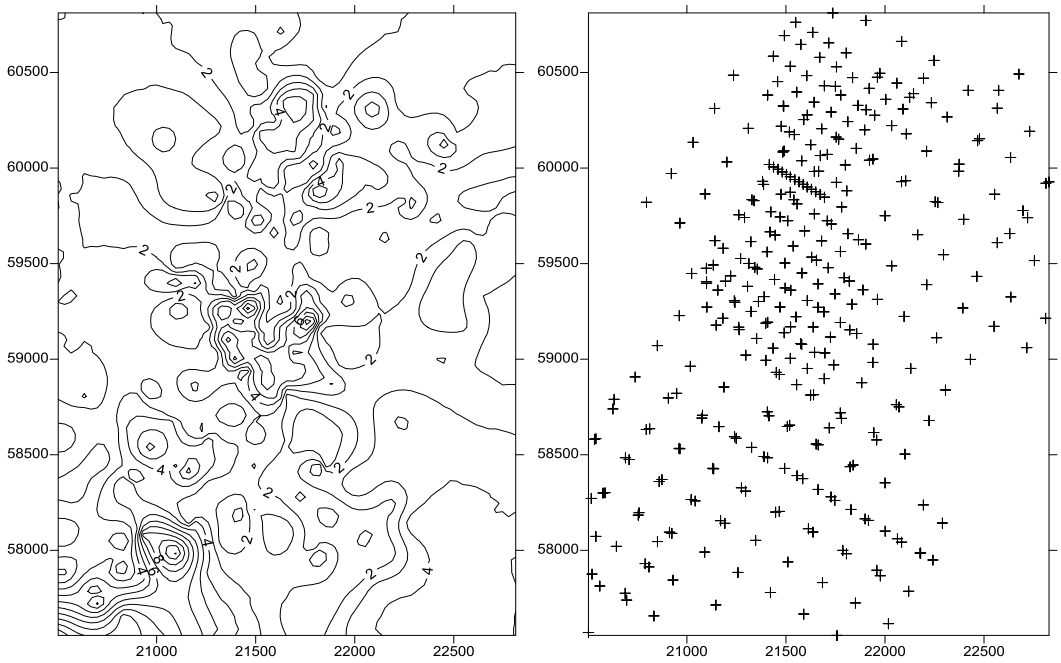

Fig. 3 Interpolation of area according to geological assay data in mining holes and bore pits

Without doubt we will get more reliable result using the greatest number of raw data. According to Fig. 2 some data may be redundant that results in the increase of economic expenses. The assessment of productive deposits thickness with different

raw data may be the reason for seeking more rational scheme of geological prospecting.

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UDC 574:630

Yu. Koziun, Master student
V. Krasnov, Dr. of Agr. Sc., Prof., research advisor
S. Sukhovetska, Senior lecturer, language advisor
ZhytomyrStateTechnologicalUniversity

THE PECULIARITIES OF THE RADIATION CONTAMINATION OF THE WOOD IN SE «BILOKOROVYCHY FORESTRY»

SE "Bilokorovychi Forestry" is situated in the northern part of Zhytomyr region and the highest rates of soil radiation contamination density are detected there.

The forestry consists of eight forest districts (Table. 1). The density of 137Cs soil radiation contamination on the territory of these districts varies from 1 to 30 Ci/km^2.

Table 1

Zones of radiation contamination in the SE "Bilokorovychy Forestry", Ci/km^2

The forestry	Total area, ha	Areas (ha) with the density of radiation contamination					
		Zone 1	Zone 2			Zone 3	
		>15,1	Subzone			Subzone	
			а	б	в	а	б
			5,1-7	7,1-10,0	10,1-15,0	1,1-2	2,1-5
Bilokorovychy	8006	442	705	871	933	1171	3884
Zhubrovychy	7271	-	-	-	-	6530	741
Zamyslovychy	8582	-	-	-	-	6279	2303

Ozeriany	7897	-	76	-	-	5446	2375
Poiasky	6982	-	-	-	-	6039	943
Radovel’	6764	-	42	259	112	3300	3051
Zubkovychy	8607	-	-	-	-	5069	3538
Tepenytsya	5750	-	-	-	-	4455	1295
Total:	**59859**	**442**	**823**	**1130**	**1045**	**38289**	**1813**

There are 442 ha of forests with the density of ^{137}Cs soil contamination ranging from 15.1 to 30.0 Ci/km^2 on the territory of the enterprise. Any management activity and the use of wood resources are prohibited here. The area of 1045 ha with the density of soil radiation contamination ranging from 10.1 to 15.0 Ci/km^2 was imposed strict regulations on the use of wood. The wood from these areas can be used for certain specific purposes.

The use of wood for fuel is banned in the forests with the density of 137Cs soil contamination of more than 7.0 Ci/km^2 (3440 ha). The territories with the value of this indicator of more than 2.0 Ci / km^2 (21,570 ha) are banned to use non-timber forest products (Fig. 1).

The total area of forest plantations contaminated by radionuclides is 59859 ha.

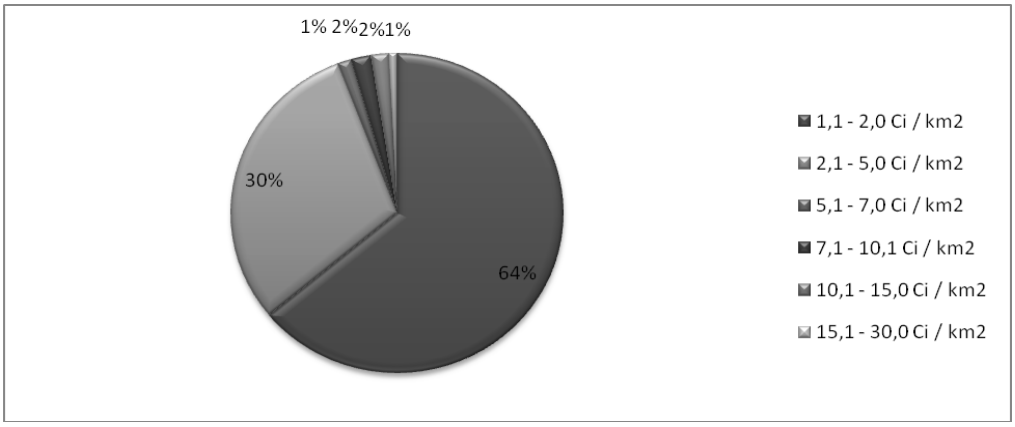

Fig.1The distribution of the forest areas with different densities of soil radiation contamination in SE "Bilokorovychy Forestry"

The study of ^{137}Cs content in tissues and organs of tree species in all types of forest vegetable conditions allow drawing some conclusions.

According to the intensity of ^{137}Cs accumulation, tissues and organs of trees can be put in the following range: leaves, pins> bark>branches>timber in the bark >timber. There is an increase of radioactive contamination in the bark with the increasing height of the trunk of the tree.

The levels of radioactive contamination of tissues and organs of Scotch pine which is the main forest forming species in SE "Bilokorovychy Forestry" were analyzed. The investigation was carried out on the typical test plot ETP-88, which is located in wet suhrudy (C3). The intensity of radionuclide accumulation was assessed

by standard relative measure, i.e., radionuclide transfer factor in the chain: soil - woody plant (tissue, organ) (Fig. 2).

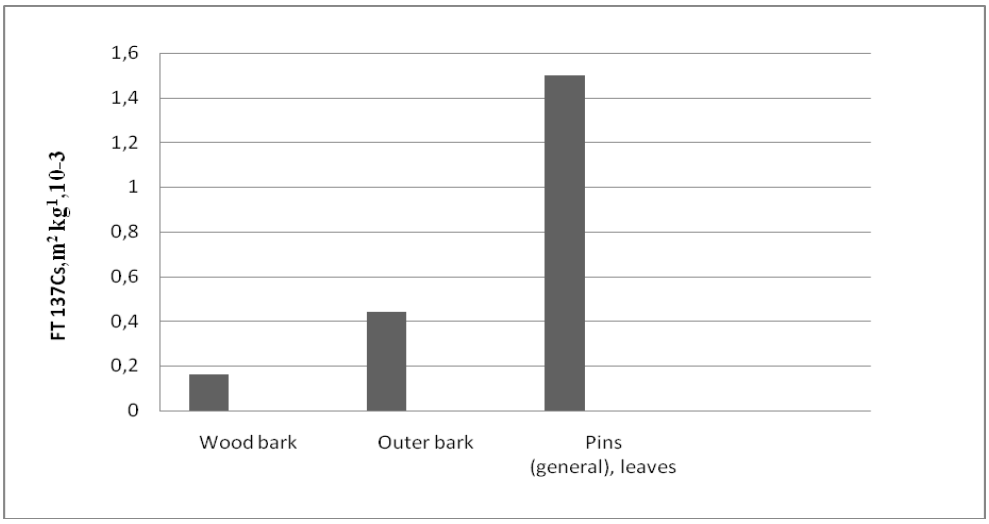

Fig. 2. The average values of ^{137}Cs TF in the tissues and organs of the tree species on the ETP-88 in wet suhrudy

Pins are the most physiologically active part of trees and the highest values of transfer factor are inherent for them. The most active metabolism processes occur in pins. Pins get a significant amount of potassium, the chemical element which is the analogue of cesium. The smallest value of transfer factor is determined for wood, but the nature of the radioactive contamination is cumulative.

The generalized results of radiological monitoring within 1991-2010 years show that the rates of wood radiation contamination are very specific. Scientists consider it possible to restore the wood use in the areas where it was restricted or banned.

UDC 629.13

O. Kukharchuk, Master student
V. Shumliakivskyi, Senior lecturer
V. Statsenko, PhD in Engr., Ass. Prof.
V. Rudzinskyi, DScTech, Prof., research advisor
I. Orlovska, lecturer, language advisor
Zhytomyr State Technological University

INCREASING THE SPEED OF TRANSPORT CONNECTIONS AND SAFETY OF URBAN PASSENGER TRANSPORTATIONS BY M2 CATEGORY WHEELED VEHICLES

The M2 category vehicles are widely used for passenger transportations in the towns due to such advantages as economy, maneuverability and others.

The research aim is to increase the road speed of rout vehicles in the town taking into account the heavy traffic and providing the safety of passenger transportations.

While researching the urban bus route number 4 in Zhytomyr we have detected such organizational and technical factors influencing the road speed of buses as:

- road conditions (type of pavement and its state, width of the roadway and its provision with the necessary facilities, highway lighting and visibility, facilities of street traffic regulation, the amount of crossing at one and different levels on 1 km of way);
- traffic density and traffic flow;
- the absence of the optimal length distances between bus stops on the route;
- the lack of organization of traffic on the bus lanes.

It is suggested to include in the formula of road speed determination the coefficients which show what the speed depends on:

$$V_t = K_1 \cdot K_2 \cdot K_3 \cdot K_4 \cdot V_c, \quad (1)$$

where K_1 – the coefficient of dependence of bus road speed on the amount of distances between bus stops on the town route;

K_2 – the coefficient of dependence of road speed of bus movement on the amount of crossings on 1 km of way;

K_3 – the coefficient of dependence of road speed of vehicle on the traffic density on the town roads;

K_4 – the coefficient of influence of road conditions on the road speed;

V_c – the speed of unobstructed connection.

In this paper the influence of traffic density on the municipal roads on the road speed of the vehicle was more thoroughly examined. The intensity changes depending on the time of the day and the composition of traffic flow.

The route area which passes through the central part of the town was thoroughly examined. The results of traffic density in the traffic flow with the indexes of acceleration and deceleration have been got. The analysis of the received data represents double the increase of test indexes that caused the delay of the route road traffic. It should be noted that the delay of the bus route road traffic arises at different traffic density of the traffic flow in the certain direction. The influencing

factors which allowed making recommendations about the optimum speed depending on the road conditions have been found out.

The delay of the route road traffic in "rush hours" has increased by 25-30 percent in comparison with ordinary or minor traffic. The traffic delay after the "rush hours" has increased by 15-20%.

To increase the traffic smoothness and the road safety the system of help to a driver bringing to the recommended vehicle speed is offered. The proposed system finds out the traffic hindrances and informs a driver about the possibility of necessary manoeuvre execution. The system determines such possibility on the basis of hardware information analysis. Such information includes the presence and distance to other vehicles, their speed; the requirements to the stationary means of traffic regulation.

The offered system can also control the traffic violation because the vehicle is connected to the GPS system and it can pass the information to the traffic control centre.

The increase of efficiency and safety of passenger transportations may be achieved only with the help of complex measures which should be implemented not only on the vehicles but also by organizational and technical activities and by means of traffic regulations.

UDC 621.914

V. Levyc'kyy, student
S. Maydanyuk, teaching assistant, research advisor
I. Stavytska, lecturer, language advisor
National Technical University of Ukraine
"Kyiv Polytechnic Institute"

STAGGERED TOOTH CUT-OFF MILLING CUTTER FOR STRUCTURAL MATERIALS' MACHINING

Disk cutting-off tool is widely used for cutting different materials as it can work in hard restricted conditions. It can be explained by high amount of teeth, unsatisfactory shape of chip flutes, short major cutting edge, adverse chip formation conditions, intermittent cutting procedure character, and variable over time load on the teeth, availability of the harmful vibrations with high amplitude and relatively low frequency. These are the reasons of intense wear and breakage of the tool, which results from chip being clamped in the flutes. That is why an amount of teeth, tooth profile's shape, the size of tooth and cavity have great importance for cut-off milling cutters.

There is a huge amount of different constructions of side cut-off milling cutters and each of them has its own advantages and disadvantages. By the construction of cutting head they can be divided into following groups:

– by the construction of the major cutting edge: with straight and zigzag cutting edge;

– by teeth arrangement: with uniform and irregular tooth spacing angle (milling cutters with irregular tooth spacing angle are characterized by increased dynamic stability);

– by tooth's profile: with small, medium and large teeth;

– by tooth's shape: with straight (directrix of the blade's face surface is rectilinear and perpendicular to the speed of the principal cutting movement) and multidirectional (directrix of the blade's face surface is rectilinear and inclined at an angle to the speed of the principal cutting movement of the milling cutter) teeth.

A great influence on the milling cutter's work is provided by an allowance shearing scheme. In practice, various allowance shearing schemes are used. For providing normal conditions of chip formation and its free placing in the tooth's kettle it is suitable to use group allowance shearing scheme by decreasing lengths of the active cutting edge on each tooth. Separation of wide chips for a range of sites can be achieved by changing the diametral sizes of adjacent teeth and cutting edges' shapes.

Cut-off milling cutters have cutting edges located on the periphery and have no minor cutting edges on the ends. Typically, the cutting edges are straight lines that are parallel to the axis of the milling cutter. As a result, cutting edges' inclinations are zero and the process of orthogonal cutting takes place when cutting is off.

Rake angles and clearance angles, measured in the perpendicular to the cutter's axis section, are chosen according to the exploitation condition. The clearance angle serves for reducing the friction between flank surface of the tool and cut surface.

Research shows that aimed clearance angles' value, which provides the highest hardness for tool, is determined mainly by the thickness of shear. Recommended values of clearance angles increase with narrowing of the shear. The thicknesses of shear have small values while cutting-off the workpiece with milling cutter, so the appropriate values of clearance angles may reach 30–45 degrees. When choosing the clearance angles consideration must be given to fact that with their increasing the roughness of the machined surface grows too, so, if raise demands are presented to the roughness and accuracy it is recommended to reduce the clearance angles' values to 3–10 degrees.

A great influence on the cutting process is provided by the rake angle. With the rake angle increasing the cheap formation process is enhanced, cutting forces and power, demanded for cutting process realization, are reduced. On the other side, rake angle increasing leads to heat rejection impairment, cutting part's strength decreasing, this raises the tool wear rate. As a result, an appropriate rake angles' values for certain machining conditions can be determined, taking in account an influence of variable factors.

Changing of the entering angle causes changing the proportion between the thickness of the sheared layer and cutting edge operating length, however the face

surface position relative to the direction of the tool movement remains constant. The thickness of sheared layer changing is caused by changing the value of the angle of shear, direct force, frictional force and shearing force, but direction of the chip movement stays unchanged.

The angle of the main cutting edge has a special place among the geometric parameters of the cutting tool. It can be explained by its the most multiplex influence on the main characteristics of the cutting process and, above all, on the sheared layer deformation, when turning it into chip.

Variation of the major cutting edge inclination is changed by each of face surface position of the tool relative to its movement direction and proportion between cutting edge's operating length and thickness of sheared layer. Furthermore, not only operating length of the cutting edge is changed but also, in some cases, the sheared layer thickness.

Under the conditions of constrained cutting multiplex influence of the major cutting edge, inclination is boosted by constrained chip flow down the face surface, which occurs when cutting edge inclination has positive sign. Changing inclination of the cutting edge leads to changes in values of operating rake and clearance angles, which also changes conditions of the sheared layer deformation and tool's flank surface run-out.

Therefore, according to the researches of variable tool constructions with different cutting edge inclination values and signs, as well as researches of the constructions of variable milling cutters, it may be concluded, that through the change of cutting head of the cut-off cutting mill geometry and cutting edge position at an angle, we can reach reducing of vibration of the working cutting mill. It makes possible to work at higher speeds, noise reduction, to improve the quality of machining, to decrease the size of burrs on the cutting mill, to change the allowance shearing scheme, to narrow the shear cut by each tooth and to provide free chip placing in the tooth's cavity, to enhance the chip formation process through chip division by width, that will provide increasing of the cut-off milling cutter lifetime.

The research of the side cut-off milling cutters shows, that using irregular tooth spacing makes a great impact on vibration while cutting, tool durability, machining accuracy and the quality of machined surfaces.

The advantage of staggered tooth milling cutters is that total forces of cutting are reduced through the change of direction of forces, which affect every milling cutter tooth, involved in cutting process currently.

Oriented on investigation made, for cutting a workpiece of structural material it is efficient to choose staggered tooth cut-off milling cutter. The choice of actual construction is based on the fact, that comparing to straight-flute milling cutters, and milling cutters with irregular tooth spacing, staggered tooth milling cutters provide cutting forces decreasing, and the quality of machined surfaces is enhanced. Comparing to milling cutters with irregular tooth spacing, certain milling cutters are more processable, there is no need to use the set of milling cutters or special milling cutter while milling.

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M. Lozhkov, Master student
Ye. Opanasiuk, PhD in Engr., Ass. Prof., research advisor
I. Orlovska, lecturer, language advisor
Zhytomyr State Technological University

THE RESEARCH OF PRESSURE BOOST AND DEPRESSION IN THE EXHAUST SYSTEM IMPACT ON THE PETROL ENGINE PERFORMANCE

It is known that 12 percent of engine power is lost to overcome the resistance in the engine exhaust system. So, changing the parameters of the exhaust process we can significantly improve the engine efficiency. Nowadays this problem is solved by changing the design of the exhaust system and the gas exchange processes characteristics. In the first case, the exhaust system resistance is changing as well as the pressure at the end of the exhaust process. That leads to the increase of engine noiseness, and so the change of the exhaust system resistance is possible only in a specific, narrow range causing the necessity to provide normative noiseness. The usage of boost systems changes the characteristics of gas exchange processes. The boost system improves the engine efficiency changing the parameters of the inlet process. But this system does not reduce the losses in the exhaust system, so it doesn't cut the losses in the exhaust system. Taking into account the above mentioned information it is possible to underline that that the problem of reducing the pressure in the exhaust system to improve the engine efficiency is relevant.

Using the features designed to improve the exhaust system functions decreasing the pressure in the exhaust manifold would facilitate more complete combustion chambers clean from residual gases and filling the cylinder with fresh charge.

It is obvious that under such conditions the number of gases that remain in the combustion chamber from the previous cycle will be the lowest. It will positively result in further filling the cylinder with fresh ions as well as the power efficiency and the environment.

The research aim is to study the influence of the main parameters of gas exchange on the performance characteristics of the internal combustion engine.

The M10 carburetor engine was tested measuring and recording the following parameters:

- the depression in the exhaust system;
- the pressure in the intake manifold;
- the frequency of the crankshaft rotation;
- the fuel consumption at different frequencies of the engine crankshaft rotation.

The analytical studies of the working process were carried out using the "Diesel RK" program.

As the result of researching the engine operations and its parameters while changing the pressure values in the exhaust system, the improvement of gas exchange parameters (the coefficient of residual gases and the admission coefficient) was defined. That led to the 6-8 percent increase of average indicated pressure as well as the engine power.

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O. Makohnyuk, Master student
Ye. Opanasyuk, PhD in Engr., Ass. Prof., research advisor
L. Mohelnytska, PhD in Phil., Ass. Prof., language advisor
Zhytomyr State Technological University

ANALYSIS OF METHODS FOR CHOOSING OPTIMUM GEAR RATIOS OF MECHANICAL SPEED GEARBOX

The main task of car designs in the world is to improve safety, environmental and efficiency indicators, while maintaining the required level of tractive-speed and brake characteristics, smoothness of motion, stability, controllability and manoeuvrability, passability of a vehicle.

Depending on the class of a vehicle, its terms of exploitation and function there is a problem of providing optimal modes of its engine when necessary load and speed modes can be implemented. In solving this problem it is necessary to take into account the type of power equipment, transmission type and, in the case of mechanical stepped transmission, gear ratios and the law of their distribution, etc. When choosing gear ratios of mechanical speed gearbox lower and higher gear ratios are primarily determined. The choice is influenced by two conditions. Firstly, it is a car budge in the heavy road conditions and driving at a minimum speed and, secondly, vehicle movement with a maximum set speed.

Determination of gear ratios, ranging from the second gear to the penultimate (before the highest) transmission is currently carried out on the following methods:

- The law of geometric progression;
- The law of arithmetic progression;

- The law of harmonic series;
- Providing the maximum intensity of acceleration;
- Providing high rates of fuel economy and transporting productivity;
- Taking into account the range density;
- By approaching the ideal transmission characteristics, etc.

The existing methods of selecting gear ratios and their allocation to M1 category vehicles of leading world motor vehicle manufacturers have been analyzed in the study. Actual regularity of their choice is determined on the basis of gear ratios distribution analysis. Calculations of traction-speed performance and fuel-economic characteristics of M1vehicles have been carried out.

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Yu. Mandro, PhD student
M. Vinichuk, Dr. of Biology, Prof., research advisor
Zhytomyr State Technological University

WOOD ASH AS A COUNTERMEASURE TO REDUCE ^{137}Cs UPTAKE BY COWBERRY: ACHIEVEMENT OF EQUILIBRIUM IN SOIL-PLANT SYSTEM

As a result of the Chernobyl accident in 1986, a significant amount of radioactive material was released in the environment. Radioactive contamination spread throughout Europe. The depositions of radioactive cesium (^{137}Cs) were 15 PBq in Belarus, 13 PBq in Ukraine and 29 PBq in Russia: a further 27 PBq was deposited in other European countries [1, pp. 37-38]. In natural and semi-natural environments, including forest, even many years after the fallout^{137}Cs is mostly concentrated in the upper 0-10 or 0-15 cm soil layers being potentially available for root uptake over the next years. The relatively long period of physical decay and high bioavailability of ^{137}Cs in forest soil make it potentially dangerous for wild animals feed by forest products as well as for humans eating MEAT that comes from WILD ANIMALS. Many countermeasures have been developed and applied for arable soils while countermeasures in forest ecosystems received less attention. There is a need for development of effective methods aiming to minimize radionuclides transfer form soil to forest vegetation, especially those species that serve as a food for wild animals and such reduce ^{137}CS body BURDEN of humans. One of the countermeasures to reduce uptake of radiocaesium by plants and fungi in forest ecosystems can be application of potassium fertilizers. Potassium is a chemical analogue of radiocaesium and, therefore, can compete with cesium when it enters the plant. Application of wood ash may be another alternative to counteract radiocaesium uptake by forest vegetation. Biofuel ashes have relatively high potassium content (3-6 %) and if there is an excess of plant-available potassium ions in the soil, the plants take up the potassium ions instead of cesium. The aim of this study was to investigate

the effect of wood ash application (both contaminated and uncontaminated with ^{137}Cs) on ^{137}Cs transfer from soil to forest plants, particularly cowberry (*Vaccinium vitis-idaea* L.).

The experiment was performed in forest ecosystems of Bazar forestry, Zhytomyr region and began on April 2012. The ^{137}Cs deposition in this area is between 185-370 kBq/m^2. The experimental plots (200 m^2 each) were randomly designed within the area of about 0.6 ha. There were 3 treatments: 1 - Control (no ash was applied), 2 – "clean" wooden ash (uncontaminated by ^{137}Cs ash denoted here as Ash), 3 – ^{137}Cs-contaminated wooden ash (about 17.2 kBq/kg, denoted here as ^{137}CsAsh). Each treatment had 4 replicates. Both "clean" (Ash) and "contaminated" (^{137}CsAsh) ashes were spread by hand on the forest floor once on April 20th 2012 at a rate corresponding 100 kg/ha potassium. Wood ash with potassium content about 3 % was used for the experiment. Samples (leaves and annual shoots) of cowberry (*Vaccinium vitis-idaea* L.), were taken monthly from May 17 till September 21 from each plot. In the laboratory collected samples were air-dried, crushed, mixed thoroughly and placed into plastic containers for gamma spectrometric measurements. The soil samples were taken by using metal sampler with a diameter 57 mm and a length of the working section 150 mm. Measurements of ^{137}Cs activity concentration in samples of plants and soil were performed at radioecological laboratories in University of Agricultural Sciences (Sweden) by using HPGe detectors and Zhytomyr State Technological University (Ukraine) by using NaI detector. Each sample was measured to achieve the error below 5% but not longer than 24 hours. The results were processed using Windas, Minitab and Microsoft Excel software. ^{137}Cs transfer factors (TF) were calculated according to equation 1:

$$TF = \frac{Am}{As} \qquad (1)$$

where: Am – activity concentration of ^{137}Cs per unit dry weight of plants (Bq/kg);
As - density of soil contamination by ^{137}Cs, (kBq/m^2).

Results of our studies showed a gradual increase of ^{137}Cs TF on Control treatment during the growing season with a maximum mean value in June about 15,53 ± 1,01 (range between 14,77and16,68). In July there was slightly decreased of ^{137}CsTF 12,28 ± 4,09 with a range between 6,15–14,40 and remained almost unchanged until September (11,39 ± 2,96 with a range between 7,23–14,17) (Fig. 1). ^{137}Cs activity concentrations in cowberry plants grown on plots with contaminated ash (^{137}CsAsh) were higher than on Control. Relatively high ^{137}Cs TF values on these plots in the beginning of vegetation could be due to ash particles were deposited on above ground plant parts at the time of ash spreading on the soil surface. Thus the maximum values of ^{137}CsTF in cowberry were observed on ^{137}CsAsh treatment on May. The average TF value was about 19,55 ± 14,54 (7,57–38,28). There was a gradual decrease of ^{137}CsTF values in the period from May till the end of vegetation.

In August the TF values for cowberry plants on the treatment with "contaminated" ash were at the level of values for the control plants (Fig. 1).

On the treatment with "clean" ash (Ash) TF of ^{137}Cs from soil to plants was higher only in the beginning of vegetation, namely in May (mean 14,62 ± 5,33 with a range 9,15–19,80), then there was a trend to lower values of ^{137}Cs TF compared to Control. Thus, during June, August September ^{137}Cs TFsfrom soil to plant cowberry on Ash treatment were significantly lower than on the Control treatment (Fig. 1).

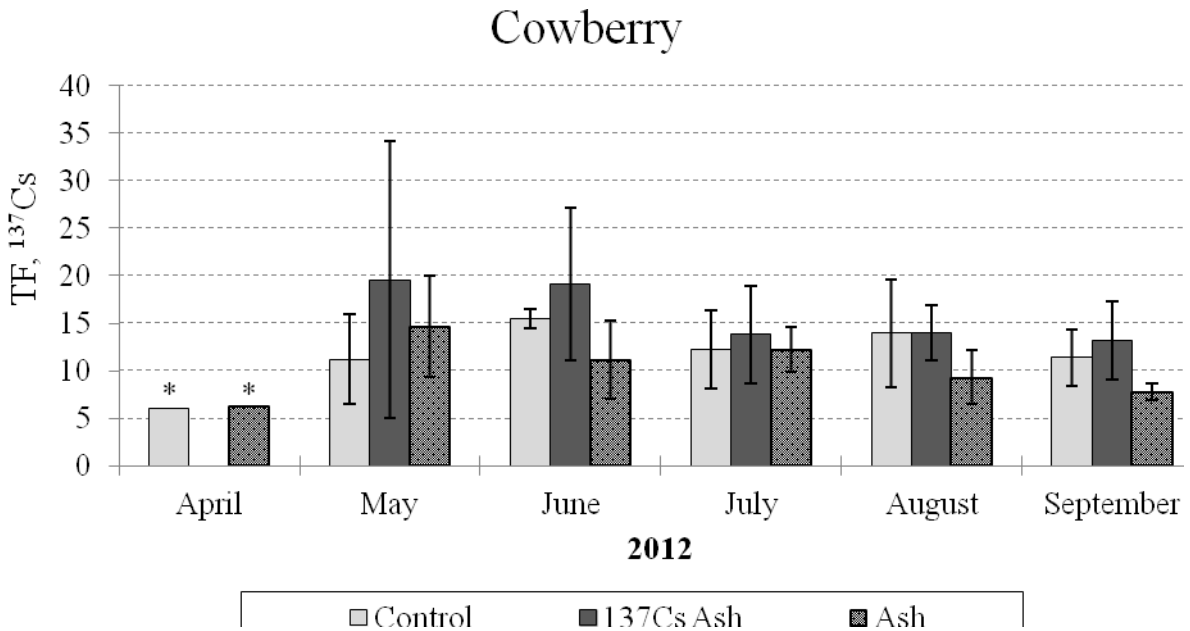

Figure 1.^{137}Cs TF values (n =3 - 4) for cowberry (Vaccinium vitis-idaea L.*) on treatments Control (no ash was applied), Ash cont. (^{137}Cs contaminated ash) and Ash (uncontaminated by ^{137}Cs ash) during the growing season in 2012.*

** - denote data obtained from 1 replicate;*

The results obtained in this study clearly show that a single wood ash application of "uncontaminated" ash was able to reduce ^{137}Cs uptake by forest plants (leaves and annual shoots of cowberry) already during the first year. ^{137}Cs TFs from soil to studied species appeared to be lower compared to that on Control already in June, just about 2 months after ash application. Application of "contaminated" ash facilitated radiocaesium transfer to cowberry during the first months, compared to control plants; however this difference was less pronounced and disappeared at the end of vegetation period. In the end of vegetation(August and September)^{137}Cs uptake by plants grown on plots with "uncontaminated" ash was clearly lower compared to both Control (33% and 31% respectively) and "contaminated" ash (34% and 41% respectively) treatments. Thus, the equilibrium in forest soil-plant system after fertilization with "uncontaminated" ash is seems to be achievable already within

one-two mouths, when fertilization with ash contaminated by ^{137}Cs seems to be require longer time – 4-5 month.

Based on the results of the first year of study it can be concluded that application of wood ash, both ^{137}Cs "contaminated" and "uncontaminated" in forest may be a feasible countermeasure to reduce radiocaesium uptake by forest plants: the effect seems to be achievable already within the first year after soil fertilization by wood ash.

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L. Melnychuk, K. Melnyk, Master students
G. Parfenyuk, PhD, research advisor
N. Kurnosova, PhD in Phil., Ass. Prof., language advisor
Zhytomyr State Technological University

WATER PROPERTIES OF PODZOL SOILS IN RESTORED AREAS

The present paper deals with water properties of podzol soils in restored areas. The intensive use of mineral deposits in Ukraine negatively affected the soil. One of the methods to reproduce the natural condition of the soil cover is the restoration of disturbed areas.

Disturbed land restoration is the process of restoring lands where the natural conditions and processes have been impacted by development of mining. The restoration is related with disturbances of the soil physical structure, water parameters, water balance, porosity, water retention forces and water flow in soils.

Special attention is given to soil moisture content. Soil moisture content is the water in the large and intermediate size pores, which can move about in the soil and can be easily used by plants.

Soil moisture content is divided into 4 types: saturated water content, field capacity, permanent wilting point, residual water content. Saturated water content (SWC) is open space in soil occupied by water. Field capacity (FC) is the amount of soil moisture or water content held in the soil after the excess water has drained away and the rate of downward movement has decreased. Permanent wilting point (PWP) is defined as the minimal point of soil moisture the plant requires not to wilt. Residual water content (RWC) is the lowest bound of existing water-retention functions of soils.

The sampling was carried out in the areas of Irshansk Mine-Concentrating Works in Zhytomyr region. The industrial area was restored in 1985 and hasn't been in agricultural use since then.

A comparative analyses was made of soil samples from restored and control areas. Different types of soil moisture content were investigated by methods of Mackiewicz and Dolgov.

The results of the experimental study are presented in table 1.

Table 1

Water capacity, % in the dry soil

Depth, sm	Restored area				Control area			
	SWC	FC	PWP	PWC	SWC	FC	PWP	PWC
0-10	46,5	29,5	18,4	11,4	42,9	31,8	22,6	11,7
10-20	44,6	29,1	17,9	10,8	37,6	32,1	23,3	11,1
0-20	45,6	29,3	18,2	11,1	40,3	32,0	23,0	11,4

The data shows that the field capacity and residual water content in the restored area became lower and amounted to 29,3% and 18,2%, while in the control area these indicators were 32% and 23%.

We can conclude that the soil restoration changes water properties in podzolic soil, but the 30-year period is not enough for full restoration of soil water constants.

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K. Melnyk, L. Melnychuk, Master students
G. Parfenyuk, PhD, research advisor
N. Kurnosova, PhD in Phil., Ass. Prof., language advisor
Zhytomyr State Technological University

FORMATION OF SOIL PHYSICAL STRUCTURE PARAMETERS IN RESTORED AREAS

In our paper we are concerned with physical structure parameters of the sod-podzolic sandy soil affected by Irshansk Mine-Concentrating Works operation in the Zhytomyr region. Soil physical properties include: texture, density, porosity, structure, consistency, soil moisture content. In our paper we consided its density and porosity.

By density we mean weight per unit volume of an object. Particle density is equal to the mass of solid particles divided by the volume of solid particles - it is the density of only the mineral particles that make up a soil, it excludes pore space and organic material. The normal soil density is 2,60 to 2,75 g /cm^3 .

Porosity is the total volume of all pores and spaces between the particles of the solid phase of the soil. Ideally, the total pore space should be 50% of the soil volume. The gas space is needed to supply oxygen to organisms decomposing organic matter, humus, and plant roots. Pore space also allows the movement and storage of water and dissolved nutrients.

The selected undisturbed samples of 0-20 cm soil layers were analyzed and their density and porosity parameters were measured. Measurements were made by

mean of the cylinder 109 cm^3 in volume. The results of our research are given in the table below.

The parameters of density and soil porosity

Soil layer, cm	Control				Reclamation			
	g/ cm^3	Porosity, %			g/ cm^3	Porosity, %		
		overall	capillary	no capillary		overall	capillary	no capillary
Ordinal indicators								
0-5	1,21	54,1	37,5	16,6	1,10	60,4	36,7	23,7
5-10	1,21	53,9	36,9	17,0	1,14	58,1	37,1	21,0
10-15	1,26	50,9	36,1	14,8	1,16	57,4	36,0	21,4
15-20	1,28	51,2	36,2	15,0	1,16	56,2	36,2	20,0
Average performance								
0-10	1,21	54,0	37,2	16,8	1,12	59,2	36,9	22,3
10-20	1,27	51,6	36,7	14,9	1,16	56,8	36,1	20,7
0-20	1,24	52,8	36,9	15,9	1,14	58,0	36,5	21,5

The data obtained show that the density of the restored samples changes with the depth and is 0.1 g/cm^3 less than the control sample density. A gradual density increase reaches 58,0%, that 5,2% exceeds the control level. The capillary porosity does not change with the depth of the soil layer and its parameter is 21,5% that is 1,4 times higher than the control parameter.

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V. Melnyk, PhD student
T. Kurbet, PhD in Agr. Sc., Ass. Prof., research advisor
S. Sukhovetska, Senior lecturer, language advisor
Zhytomyr State Technological University

PINE PLANTATIONS OF UKRAINIAN POLISSIA CONTAMINATED BY RADIONUCLIDES

Violation of the natural course of the forest ecosystems development is the result of the combined effect of many factors - abiotic, biotic, anthropogenic, social and technical. These factors cause deterioration of forest ecosystems' stability:the growth of stands reduces; the structure of forest soils undergoes significant changes; vegetation cover, underbrush and undergrowth degrade.

Ukraine is a sparsely wooded country. Degradation of forests, reducing their productivity and stability under adverse environmental factors cause the transition to sustainable forestry development.

The Chernobyl accident was one of the largest sources of radioactive contamination of forest ecosystems. Today, the radiation situation remains difficult in the woods. Soil radiation contamination is of mosaic character. Large value

fluctuations of soil radiation contamination within a forest block or even stratum is typical.

Contamination of forests was detected in eighteen regions of Ukraine after the Chernobyl accident. During 1991-1992, about3,2 million hectares of forest areas of the state forest fund were investigated and 1,23 million hectares (39%)had the density of ^{137}Cs soil radiation contamination above 37 kBq/m^2 (1 Ci/km^2).Forests of Ukrainian Polissiawere badly contaminated by radiation.The large areas (32.4 thous. ha) with the highest levels of soil radiation contamination are located in Zhytomyr region. These territories are prohibited to carry out any activity, except protection forests from pests, diseases and fires.

High productivity and viability of plantations in man-made forests is provided by timely application of scientifically based forest management.A natural formation of space-parametric structure due to the falling away of the wood excessive amounts can be observed in forest stands that are left without thinnings.

The most nonfireproof, young and middle-aged pine monocultures dominate in dry and fresh types of forest conditions in Ukrainian Polissia forests. A large number of dead trees and the reduceof human activity in radiaion contaminated forests cause the risk of forest fires and the threat of radiation contamination of boundary areas. Fires occur regularly in the forests which are located in areas of high radiation contamination and are left unattended. 17 000 hectares of forestswere destroyed by fire for the period of 10 years after the Chernobyl accident. Thus, a rational system of forest management aimed to reduce the fire risk, to limit reproduction of entomopests and to restore damaged forests should be implemented in contaminated areas.

Scotch pine (Pinus sylvestris L.) is a common species for forest ecosystems in the exclusion zone and one of the most radiosensitive plants. That is why pine is used as an indicator of radionuclides contamination for the ecosystem monitoring and forecasting the environmental conditions in the Chernobyl exclusion zone. This type of species grows on depleted lands of 30-km exclusive zone of Ukrainian Polissia. Scotch pine demonstrates a large number of deterministic and stochastic radiobiological effects. Characteristic features of such effects are the following: cytogenetic disorders, first of all in the form of chromosomal aberrations in plant mitotic cells; and some genetic effects. The rate of photosynthesis, transpiration, synthesis of certain metabolites, including some proteins, and other processes also reduce. The slow down of plant growth, the delay ofsome ontogeny phases and the increase of the growing season duration are also observed.

The development and growth inhibition processes are typical for coniferous species growing in burial grounds of "Red Forest" where the levels of ^{137}Cs and ^{90}Sr specific activity in plants are of hundreds kBq/kg. After the Chernobyl accident many researchers have paid much attention to the study of ionizing radiation effect on Scotch pine in conditions of radiation contamination. Unfortunately, these studies

were conducted in different years and were not linked, thus, the results are fragmentary and unsystematic.

Cessation of the activities in forests which are located in the exclusion zones and zones of unconditional resettlement after the Chernobyl accident led to the appearance of a new category of man-made forests. The development and growth of these forests are governed almost without external interference. To predict the processes of vegetation formation or vegetation decay is extremely difficult because of the aftereffects (both positive and negative) of the previous forest activity and a large number of local and temporary abiotic and biotic factors. Today the need for management intervention in areas of radiation contamination density of 15-40 Ci/km^2 or even more than 40 Ci/km^2 is obvious.

Countermeasures against the decrease of the stability and productivity of pine stands should be the following: the transition from passive removal of contaminated trees off the sphere of economic activity to the strategy of active implementation of measures for rehabilitation forest areas. An integral part of such strategy should be a purposeful realization of complex cuttings as a part of forestry activity and forest regeneration measures.

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O. Nidzelsky, Master student
M. Vinichuk, Dr. of Biol. Sc., Prof., research advisor
S. Sukhovetska, Senior lecturer, language advisor
Zhytomyr State Technological University

THE ESTIMATION OF EXTERNAL EXPOSURE OF THE RESIDENTS OF MULTI-STOREY HOUSING IN ZHYTOMYR

The accident at the Chernobyl nuclear power plant was a terrible experience of radiation effects on the human body. Almost 29 years have passed but the effects are still felt today. A number of legislative acts to control the radiation background were adopted to protect the public from exposure. No building could be put into operation without a thorough environmental appraisal of housing on radiation safety [2].

At present, according to the radiological and dosimetric monitoring, the dose structure of additional public exposure in different regions of Ukraine has significant distinctions. Residents' exposure ranges from 0.1 to 5.0 μSv for a year. External exposure in areas of Ukrainian Polissia does not exceed 20% of the total dose.

External exposure in buildings is formed by gamma-emitting of natural radionuclides contained in building materials. The levels of gamma radiation increase with the increase of radionuclides content inside the building. If the person is inside the building, the external exposure dose changes under the influence of two oppositely acting factors: shielding of external radiation by a building and irradiation of natural radionuclides that are in the materials the house is built of. The dose

intensity in buildings varies considerably depending on the ^{40}K, ^{226}Ra, ^{232}Th concentration in various construction materials [1, 2].

Today people live in the conditions of increased radiation levels and the permissible level of 0.1-0.2 μSv/h is considered normal; the level of 0.2-0.6 μSv /h is considered acceptable; and the level of more than 0.6-1.2 μSv/h is recognized as high [3]. Artificially generated radiation sources constantly increase the level of natural radiation background and therefore it must be adjusted. In addition, some areas of Zhytomyr region are located in the area of the occurrence of Ukrainian crystalline massif with rocks rich on uranium and thorium. Thus, the levels of radioactivity in multi-storey housing of Zhytomyr were investigated.

Measurements of external gamma background in the buildings of 8 Zhytomyr streets were conducted according to the research program. In general, 54 measurements in entrances of buildings and 18 outdoor measurements were conducted. 36 measurements of the total number were conducted in multi-storied buildings (20 measurements conducted in buildings made of red brick and 16 measurements in buildings made of lime-sand brick. Investigated buildings are constructed of different building materials: concrete blocks, red brick, lime-sand brick.

The measurements were performed in a sufficient distance, i.e., about 20 meters from the building considered as an alleged source of radiation. After this, the measurement was performed directly inside the building and next to the building. The places of basic research (points of measurement) were determined as follows: the first point was the measurement of gamma background next to the building; the second point – measurements on the first floor, the third point – measurements on the middle floor of the building (depending on the number of floors), the last point of measurement was the top floor. Each measurement was performed at least 2 times on each point of the investigation and the average arithmetic value was calculated. Measurements were conducted in the period from 14 pm to 15 pm. All investigations were performed within one week.

Measurements of external gamma background in multi-storied buildings of Zhytomyr were performed with a special appliance RADOS (RDS-30), the value of measurement – μSv/h. This appliance is designed both for the rapid assessment of radiation situation and for the estimation of the dose rates of staff when working with sources of photon radiation at nuclear power plants, at the enterprises of nuclear industry and other radiation-hazardous sites. Dosimeter RDS-30 has an energy range: 0.01-100 μSv/h. The principle of its operation is based on gamma radiation detection by Geiger-Muller counter. The dosimeter error ranges from 0,005 to 0,045 μSv/h [5;6] within the range of 0.12-0.20 μSv /h.

Streets	Number of measurements	Floor	Gamma radiation μSv/h, (M±m)	Average in buildings μSv/h, (M±m)
Buildings of red brick				
Vitruka, 16; Vitruka, 21; Peremohy, 25; Chernyakhovsky, 18; Chapaeva, 36	5	Ground floor	0,12 ± 0,025	0,13 ± 0,005
	5	Middle floor	0,13 ± 0,02	
	5	Top floor	0,13 ± 0,03	
	5	Outdoor	0,20 ± 0,025	0.20 ± 0,025
Buildings made of lime-sand brick				
Gagarin, 22; Peremohy , 29; Kyivska, 16; Chernyakhovskogo 21	4	Ground floor	0,13 ± 0,01	0,15 ± 0,02
	4	Middle floor	0,15 ± 0,025	
	4	Top floor	0,17 ± 0,01	
	4	Outdoor	0,19 ± 0,025	0,19 ± 0,025
Panel buildings				
Korolyova, 44; Korolyova 46; Korolyova , 57; Gagarina, 18; Gagarina, 21; Peremohy , 18; Kyivska, 11; Berdichivska, 78; Berdychivstka, 60a	9	Ground floor	0,16 ± 0,045	0,18 ± 0,015
	9	Middle floor	0,18 ± 0,07	
	9	Top floor	0,19 ± 0,065	
	9	Outdoor	0,19 ± 0,045	0,19 ± 0,045

1. Table Indoor and outdoor levels of external gamma radiation

As can be seen from Table 1, the levels of external gamma radiation depend on the construction materials and the floor of the building.

The data on radiation background in brick and in panel buildings were compared. The buildings constructed of red brick have the levels of gamma radiation in the range of 0.12 to 0.13 μSv/h; the outdoor radiation is 0.20 μSv/h. The gamma radiation levels in buildings constructed of lime-sand brick range from 0.13 to 0.17 μSv/h; the outdoor radiation is 0.19 μSv/h. In panel houses levels of gamma radiation range from 0.16 to 0.19 μSv/h; outdoor radiation is 0,19 μSv/h. It is estimated that radiation levels inside buildings constructed of red brick are 35% lower than the outdoor levels; the levels inside the building constructed of lime-sand brick are 21% lower and the levels inside the panel buildings are 5% lower compared to outdoor values.

The average level of gamma radiation in all buildings does not exceed 0, 20 μSv/h (taking into account the device error). Radioactivity on the top floors of some panel buildings was slightly higher than on the ground and middle floors; the average is less than 0, 20 μSv/h. It is estimated that the maximum dose of external gamma radiation accumulates in panel buildings (an average - 0.18 μSv/h); the average levels

of gamma background accumulate in buildings made of lime-sand brick (0.15 μSv/h); the lowest levels of gamma background accumulate in buildings made of red brick (0.13 μSv/h). The comparison of the average outdoor radiation backgrounds showed that the difference among them is not significant: 0.20 μSv/h for buildings of red brick; 0.19 mSv / h both for panel buildings and buildings of lime-sand brick.

Levels of indoor gamma radiation (the norm rate 0.15 - 0.20 μSv/h) does not exceed the outdoor external radiation (the norm rate 0.08 - 0.12 μSv/h). Consequently, the equivalent dose of gamma radiation in Zhytomyr in all studied buildings, including panel buildings, is within the norm (the norm 0.25 - 0.30 μSv/h) [3].

As a rule, the granite gravel is used as filler in the preparation of concrete. It caused the rise of radiation background in buildings made of concrete. The contribution to the total radiation background makes lime-sand brick which is used in facing buildings more often than granite. This is evidenced by the difference in the results calculation of the average dose of gamma radiation in panel buildings and buildings made of lime-sand and red brick.

Thus, the data on the radiation background show that it does not exceed the permissible standards and does not create a risk to stay both in brick and in panel buildings in Zhytomyr. However, the main problem of radionuclides accumulation in studied entrances and multi-storied buildings is the radioactivity of construction materials. These construction materials form external radiation which depends on the rate of material radioactivity caused by the radionuclides irradiation contained in this material.

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D. Nestertschuk, Master student
O.Tolkatsch, PhD in Eng., As. Prof., research advisor,
S. Kuriata, Senior lecturer, language advisor
Zhytomyr State Technological University

ÖKONOMISCHE BEURTEILUNG DER STABILITÄT DER KOMPLEXARBEIT VON GRUBENAUSRÜSTUNGEN DES BRUCHSTEINES UND STEINSCHUTTES

Heute ist die Hauptrichtungen der Entwicklung der Bergbauindustrie in der Ukraine die Arbeitsintensivierung und Senkung der Produktionskosten. Das kann durch das Wachstum der Belastung auf die Maschine, durch die Zunahme der Arbeitszeit und durch die Reduzierung der Zeit für ihren Dienst erreicht werden. In diesem Zusammenhang werden hohe Ansprüche auf die Zuverlässigkeit und Leistungsfähigkeiten, die man ohne ständige Kontrolle der Stabilität der Komplexarbeit von Grubenausrüstung gewährleisten kann, erhoben.

Die Grubenausrüstung wird für die Arbeit in den bestimmten Bedingungen und in die entsprechende Leistungsfähigkeit hergestellt. Die konstruktiven Parameter lassen einige Abweichungen von diesen Bedingungen zu. Insgesamt sollen die Maschinen und Geräte, die für sich hergestellte Norme der Produktivität $Q_н$(m^3) erfüllen. Diese Norme werden für die Durchschnittsbedingungen der Arbeit kalkuliert und, damit die Regeln der technischen Ausbeutung und die Ausnutzung von Grubenausrüstung berücksichtigt.

Die Schwankungen der Produktivität der einzelnen Phase der Produktion verursachen die Erhöhung der Selbstkosten des Prozesses. Aufgrund der unregelmäßigen Arbeit eine der technologischen Linien wird die Selbstkosten der Förderung in einem Komplex Ausrüstung.

Es wird betrachtet, die Wirkung der Arbeitsstabilität auf die spezifischen Kosten am Beispiel des Kettengliedes, das mit den Baggern komplettiert, die Operation von Ausziehen und Verladen.

Die Selbstkosten des Ausbaggers der Gesteine *UAH./m*^{3}, ist die Funktion, der leistungsfähigen Produktivität von Baggern $Q_{зм.}$, *м*^{3}:

$$C_в = \left(\frac{C_c + C_v^{'} T_к}{N_p} + C_v^{''} T_c K_в \right) / Q_{зм.}, \qquad (1)$$

wo $C_c, C_v^{'}, C_v^{''}$-entsprechend zu den konventionell-ständigen jährlichen, zu den schihtlichen Kosten auf 1 Stunde der Kalenderzeit und zu den für 1 Moto-Stunde der Baggerarbeit, *UAH*;

$T_к$- Jahres-Kalender Fonds der Arbeitszeit,*Stunde*;

N_p- Anzahl der Schichten des Baggers im Jahr.

Die Erhöhung der Produktivität nimmt die Selbstkosten$\Delta C_e^{'}$an, und die Abnahme der Produktivitätauf dieselbe Größe steigert die Selbstkosten$\Delta C_e^{''}$. Aus (1) folgt, dass$\Delta C_e^{'} < \Delta C_e^{''}$, das heißt, die Abnahme von Kosten durch die Erhöhung der Produktivität weniger ist, als die Erhöhung bei der Abnahme der Produktivität.

Der Anstieg der spezifischen Kosten auf die Entwicklung des Gesteins wird durch die Differenz der Geschwindigkeit der Volumenänderungen und durch die gesamten Betriebskosten auf die Wartung und Instandhaltung der Geräte verursacht. Bezüglich der Geschwindigkeit der Veränderungen von Gesamtkosten wird die Produktivität der Ausrüstung schneller reduziert und langsamer gewachsen. Die starke Steigerung der Produktivität des Baggers begleitet mit dem starken Rückgang der Selbstkosten des Versands des Gesteins und umgekehrt, ein starker Rückgang der Produktivität führt zu der starke Erhöhung von Kosten. Die übermäßige Zunahme der Leistungsfähigkeit der Geräte bewirkt die schnelle Abnutzung der Ersatzteile, Seile, Schmierstoffe, Gegenstände von geringem Wert. Und umgekehrt, der deutliche Rückgang der Produktivität führt zu dem erhöhten Verbrauch von Strom, Lohn für die Haupt-und Reparaturarbeiter, Verschleiß der Ersatzteilen, Kosten auf Schmierstoffe und Gegenstände von geringem Wert (Inventar).

Für einen bestimmten Zeitraum erfüllen die Bagger durchschnittlich die Norm der Produktivität, obwohl in den einzelnen Schichten unterscheidet sich Produktivität von der normativen Wert:

$$Q_{з.м} - Q_н = |q|. \qquad (2)$$

Der zahlenmäßige Ausdruck in Klammern der Formel (1) zeigt den Wert der Maschinen-Schichte $C_{м-з.м}$, *UAH*, die Wartung und Instandhaltung des Baggers. Wenn die variable Produktivität der letzten sinkt auf der Größe und steigt dann auf dieselbe Größe, so ist die durchschnittlichen Selbstkosten der von Ausziehen und Verladen der Gesteine:

$$C_в = \frac{C_{м-зм} Q_н}{Q_н^2 - q^2}. \quad (3)$$

Die Überschreitung der Selbstkosten des Ausbaggers, *UAH./m*^{3}, aufgrund der Schwankungen der Produktivität ist:

$$\Delta C_в = \frac{C_{м-зм} q^2}{Q_н (Q_н^2 - q^2)}. \quad (4)$$

Aus der Formel (3) folgt, dass die Schwankungen der Produktivität der technologischen Ausrüstung die Erhöhung der Selbstkosten Ausziehen und Verlagerung von Gesteinen auf eine Größe proportional $q^2/(Q_н^2 - q^2)$ verursachen.

Also, das System der Ausrüstung in den konkreten Bedingungen soll mit der Produktivität, die maximal mögliche unter den Bedingungen ihre stabile Erhaltung arbeiten.

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V. Novikov, Bachelor student
V. Shumliakivsky, Senior lecturer, research advisor
N. Krushynska, lecturer, language advisor
Zhytomyr State Technological University

ORGANIZATION OF MOTOR-TRANSPORT PARKING FACILITIES IN A MODERN CITY

The problem of modern cities is a great traffic causing difficulty parking. The need for parking depends on the level of car ownership in the country or region, characteristic of the urban area, the specific gravity of objects and so on. However, the problem of parking is not given due importance. Parking cars is done in violation of existing norms and basic rules of conducting. Because of parking in inappropriate

places visibility of conflicting vehicle or pedestrian reduces. Parking on the roadway, sidewalks prevents motor traffic, particularly urban passenger transport. In other words, it has become an urgent problem and dramatically exacerbated by the growth of car ownership. Opportunity of automobile parking in the street depends on its width and traffic. At low traffic (up to 100 cars/hr.) the width of the roadway street must be more than 6 m. The width of the roadway street for one-way streets should be 6-9 m, with the speed of 25-30 km, with a width of more than 9 m it is possible to have two-way traffic. Such parking is allowed only in local streets and on the side (local) rides highways. On the carriageway highways such parking reduces bandwidth of street and significantly increases the risk of movement. The most widely spread method is ground parking, which is not always feasible. It has several types of the of setting vehicles method, namely at angles of 90, 45, 30 degrees to the roadway. Types of setting have advantages and disadvantages in practice. Let us consider the angle of 90 degrees, there is a higher density, but it will needa greater width of the roadway for entry and exit during parking. It will take more time, and this may create a traffic jam. Another picture of the angle parking, lightweight race, occupies a smaller width of the roadway, but needs more space in a longitudinal direction.

In cities there are narrow streets with a large influx of cars. In these places, parking along the roadway is not appropriate. We offer to consider the following types of automatic parking systems:

1. Parking lift:

- work is almost silent and almost inaudible at night (noise level reaches 34dB);
- resistant to vibration;
- low power consumption;
- fast loading and unloading;
- direct entry and exit (all twists and turns made automatic without the driver).

2. Rotary park:

- allows the entire volume of design to create parking spaces;
- direct entry and exit;
- significant noise, which requires automatic parking placed in an isolated part of the building or in the building.

3. Underground parking:

- using mechanized parking systems with robotic car delivery organization underground parking becomes easier;
- due to the increasing amount of compaction car-places underground works can be significantly reduced;
- robotic system eliminates the need to use drivers maneuver in tight spaces;
- moving car-places is performed automatically by the optimized computer program that reduces the possibility of traffic jams at rush hour.

4. Multi level parking:

- ability to organize parking for a large number of cars in the middle of the room, and underground;

- especially useful for automatic parking existing buildings with increased demand for cars.

The best places of the most automated systems will be in the areas of high density of buildings and motorization of the population, for example at shopping malls and business centers, where there is a great need for a vehicle and parking place.

Such systems will save 35-50% of the area depending on the type. The price of these varies from 6000-7000 dollars. It is important to note the high speed, for example, the car park or delivery is made for 50-90 seconds. Commercially reasonable price for parking may be 9 hrn. per entry per 1hour, while in the streets of the European countries such as Austria, Italy, Germany, the Netherlands, the price of parking on average is 2 dollars and limited in time.

Thus, implementing the types of parking stated above, you can significantly reduce congestion, provide the rational use of local area and provide comfort to the residents of the city.

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A. Oblozhok, PhD student
V. Kotenko, PhD in Eng., As. Prof., research advisor
I. Orlovska, lecturer, language advisor
Zhytomyr State Technological University

THE ANALYSIS OF TECHNICAL REQUIREMENTS TO THE QUALITY OF BLOCK RAW MATERIALS

The most common initial product is a commodity raw block unit. Product unit designed for manufacturing cladding panels, architectural building products and other products made of stone. In accordance with the requirements of the standard they are characterized by shape, length, width, height and volume, quality of facial surface, physical and mechanical properties of the rock block. In addition, the rock from which the blocks are made, is assessed for decorative, physical and mechanical properties and petrographic composition at the stage of geological exploration. However, a different range of customers put different demands to the quality of products that can be significantly changed from the range of ISO requirements.

The separation of rocks monoliths or blocks from the massif is held by mechanical, wedge-drilling, drill and fire system, thermal methods or the combination of these methods, as well as with non-explosive destructive methods.

The blocks of natural stone can be sawn or chipped. The sawn blocks are the blocks all side of which are formed by sawing, and the chipped blocks are the blocks in which at least one side was formed by directional split.

In Ukraine there was the DSTU B V.2.7-59-97 “Natural stone blocks for facing products manufacturing. General technical characteristics” which provided the division of blocks accpording to the volume into six groups (m^3): I -> 5; II – 3.5-5; III – 2.0-3.5; IV - 1.0-2.0; V – 0.7-1.0; VI – 0.01-0.7. For sawn and chipped blocks of the first-third groups the deviation from the perpendicular to two adjacent faces at 1 m height was no more than 60 and 110 mm, respectively; height ledges and hollows lateral faces were less than 150 and 200 mm, respectively, and the top and bottom - 100 m.

In 2007 in Ukraine the European standard EN 1467: 2003, called DSTU B EN 1467: 2007 “Natural stone. Rough blocks. Requirements” came into practice. This standard specifies requirements to the natural stone rough blocks which the products used in construction, tombstones and other products of similal usage are made of and it does not cover mineral fillers, artificial materials from agglomerated stone and installation [1, p.118].

According to this standard the natural stone blocks are divided into four types:

- rough block - basis of the usable stone consisting of rocks obtained directly from quarries or erratics, with no processing whatsoever excepted extraction and shaping by cutting or splitting;
- shapeless rough block - rough block without regular shape and size;
- squared rough block - rough block which corresponds approximately to a regular parallelepiped. Normally the ratio obtainable by dividing the mass of the squared rough block by the apparent density should be bigger than 80% of the gross size; in case such a ratio is equal or less than 80% then the block is considered a shapeless rough block.;
- rough block of specific size - squared rough block with certain given dimensions[4, p.47].

All measurements shall be carried out in accordance with EN 13373, and indicated in metres to two decimals places *(Fig.1)*. The six sides of squared rough block shall be approximately flat, right-angled and parallel, and correspond to the shape of a parallelepiped. Local deviations from the parallelepiped shape are permitted.

Shapeless rough blocks for commercial purposes are only measured by mass: gross size shall be provided upon request *(Fig.2)*. Rough blocks of specific size shall have dimensions not lower than the minimum values and not greater than the maximum values agreed between the purchaser and supplier.

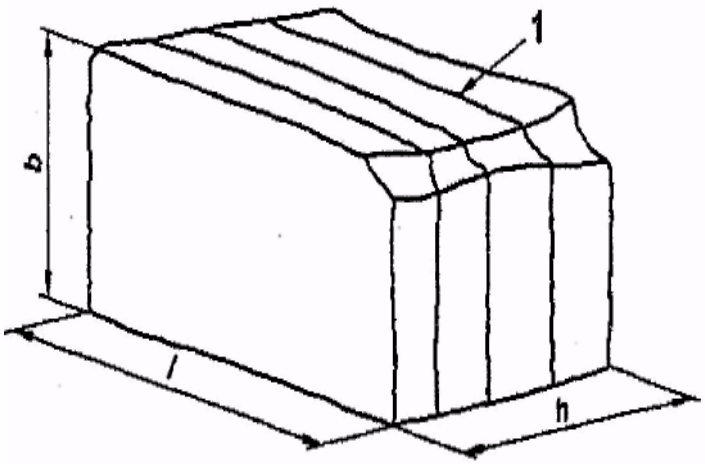

Fig.1. Dimensions of the rough block:
1 - natural layer
b - width of the block
l - length block
h - height of the block

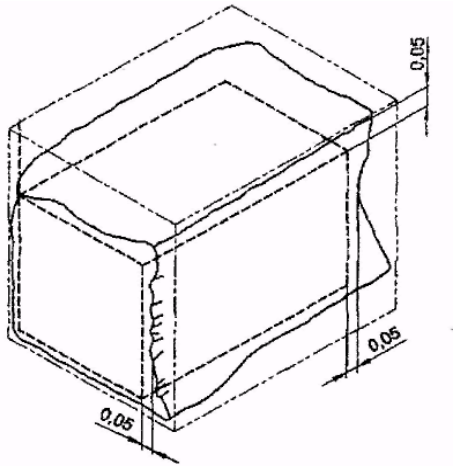

Fig. 2. Gross size, the commercial size of the rough block

The volume of a rough block shall be stated in cubic metres to three decimals places. The volume may be calculated by dividing the mass of the block by the apparent density. The mass of a rough block shall be stated in tonnes with three decimals. The mass shall be obtained by weighing; for squared blocks approximate mass may be obtained by multiplying the volume by the apparent density [2, p.6].

The crack of tectonic origin that violates its integrity and extends to two adjacent facets of a width of not more than 0.05 mm and in a length of 1/3 the size of the smallest faces is allowed in the block. The streaks and stripes created by tectonic origin and cemented with secondary minerals that are not crumbled into small pieces can also be in the blocks.

The declared values shall be representative of the current production, however due to natural variations of the stone materials, deviations from the declared values may occur and the expected deviation shall be indicated by the manufacturer.

The colour, vcining, texture, etc. of the stone shall be identified visually for example by a polished reference sample. The reference sample shall be provided by the supplier.

Any visual variation, for example, inclusions and veins, are permissible provided that they are characteristic of the relevant type of natural stone and provided that they do not adversely affect the performances of the stone products.

The denomination shall always be declared in accordance with EN 12440 (it means traditional name, petrological family, typical colour and place of origin). The

petrological family shall be determined in accordance with EN 12407. This characteristic shall be declared upon request.

The apparent density and open porosity shall be determined using the test method in EN 1936 and mean value, lower expected value and standard deviation shall be declared. This characteristic shall always be declared.

The flexural strength shall be determined using the test method in EN 12372 or EN 13161 and mean value, lower expected value and standard deviation shall be declared [3, p.9].

Ukrainian manufacturer recently began to focus on foreign standards of raw block quality, but each country has its own standard. The main exporters of Ukraine are Norway (NSF), Iceland (IST), Netherlands (NEN), Belgium (IBN), Ireland (NSAI), United Kingdom (BSI), Portugal (IPQ), Spain (AENOR), France (AFNOR), Switzerland (SNV), Italy (UNI), Greece (ELOT), Austria (ON), Czech Republic (CSNI), Germany (DIN), Denmark (DS), Finland (SFS), Sweden (SIS) [4, p.33].

Different standards of block raw materials quality are oriented to different ranges of customers from different countries, but they are not perfect.The State Standards of Ukraine describe the requirements to physical, geometrical and technological parameters of the block, but they do not take into account the requirements to the parameters that can vary from the separate stage in the massif to the stage of processing at the enterprice. Foreign Standards describe various methods to determine different parameters of the block excluding specific standards for different parameters. So, we can make the conclude that the current standards are not universal and need to be detailed.

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I. Pavliuk, PhD student
S. Iskov, PhD, Ass. Prof. of ZSTU, research advisor
S. Kobzar, Senior lecturer, language advisor
Zhytomyr State Technological University

CLASSIFICATION OF ROCKS IN A MASSIF ACCORDING TO FISSURING COEFFICIENT OF THE STRUCTURAL WEAKENING

Fissuring of rocks interests a mining engineer from the point of view of its role as a weakening factor. This factor is the subject to the account at the solving of the tasks of firmness of mining objects in choosing the optimal facilities of destruction of rocks in a massif and in estimation of their physical properties. The knowledge of regularities of fissuring development on the whole, systematization and analysis of the data on fissuring will allow to forecast more reliably the mining conditions of deposits, will render an invaluable help to the designers and operatives at the solving a number of problems. In particular, it will allow to detect and take into account the zones of weakening, to choose the places of the mother entries, to calculate the parameters of the management of the rocks massif state.

Fissure is the break of the wholeness of the environment, the size of which exceeds by far and more the interatomic distances in crystalline grates (i.e. more than 10^{-10}м).

By the origin the fissuring of rocks is divided into untectonic, tectonic and planetary. Untectonic fissuring of rocks is the consequence of rock shattering in the process of cooling (for igneous rocks), of compression, and of dehydration (for sedimentary rocks).

Technological fissuring caused by the mining operations and rock fissuring in the zone affected by mining, caused by mountain pressure etc. also belong to untectonic fissuring.

Tectonic fissuring develops in rocks due to tectonic processes, it is caused by mountain formations and by deep movements of platforms.

Planetary fissuring is connected with tensions caused by the change of frequency of rotation of the Earth and its forms.

There are a lot of classifications of fissuring of rocks. So, N.M. Proskuriakov distinguishes natural fissuring, i.e. cracks that arose in rocks without the influence of mining works, and technological or operating cracks, i.e. cracks that appeared in rocks under the influence of cleansing excavation. Thus, natural fissuring includes the cracks of cleavage and tectonic fissuring. Taking into account the orientation of cracks in relation to stratification, the line of cleansing coalface and mutual location of the systems of cracks, N.M. Proskuriakov distinguishes eleven groups of cracks.

He suggests to estimate the firmness of a seam roof in lava quantitatively by the coefficients of dump formation, bench formation and by the coefficients of fissuring of the roof that is calculated according to the formula (1.1).

$$K_T = \sum l_T / S_0, \qquad (1.1)$$

where $\sum l_T$ is the total length of visible cracks on the sector of working-face of the space, overcame by cracks, m;

S_0 is an area of this sector, m^2.

But N.M. Proskuriakov does not give the classification of rocks of the roof in lava taking into account K_T.

V.V. Rzhevsky and G.Ya. Novik classify cracks according to next five signs: the opening degree, size, form, geometrical interrelation of cracks with cleavage and the angle of slope to the horizontal line.

In the Directions of Research Institute of Mining Geomechanics and Mine Surveying (RIMGMS) the classification of rocks is given depending on the intensity of fissuring, i.e. on the sizes of pieces into which the core is divided or on the distance between the cracks. The more intensive the fissuring is, the less the value of the coefficient of the structural weakening of massif K_c is (table 1).

Table 1

Classification of rocks in a massif according to fissuring

Category of rocks on fissuring	Distance between the surfaces of weakening *l*, m	Coefficient of the structural weakening, K_c
Practically monolithic	>1,0	0,9
Little fissured	0,5 - 1,0	0,8
Medium fissured	0,3 - 0,5	0,6
Fissured	0,1 - 0,3	0,4
Very fissured	<0,1	0,2

All above mentioned show that presently there is not the unique classification of rocks in a massif according to fissuring. The analysis of the existing classifications allows accepting for practical aims the classification of rocks in the massif according to fissuring offered by RIMGMS and complemented by the names of the rock categories.

UDC 672

A. Savchenko, student,
A.Lavrynenkov, assistant
National Technical University of Ukraine "KPI"

PRESS-STAMPING EQUIPMENT

Progressive technology of forging and stamping production is based on receiving parts or workpieces in a result of rational metal redistribution and not by removing it in shaving as it provides cut processing. Metal forming methods produce the most complex and responsible parts of aircraft engines, ships, space rockets because plastic working allows receiving products with high mechanical properties.

Technological processes of plastic working are characterized with considerable specific efforts of deformation resistance, significant energy costs, which have brief, also called peak character. That is why most of press-stamping equipment is «power amplifiers»; thus, it is supported with accumulators that provide opportunity of using energy accumulated before. Varied combinations of construction of accumulators and mechanisms, that transmit energy, define diversity of press-stamping equipment. During scientific-technological revolution, new types of machines were created where the latest discoveries and achievements of science were used. Machines for deformation by using explosion energy, pulsed electromagnetic field, and hydrostatic machines were introduced in production. This leads to continuous improvement and enrichment of classification, which should comprise all types of machines and serve as a basis for studying and improvement of equipment and its implementation in industry. On the base of this principle, 5 main types of press-stamping equipment are divided: presses, hammers, rotary machines, impulse machines and states, which differ mainly by changing speed in time of working stroke and specific efforts that explicate the machines.

Creating servo-drives, motors for automatic control of machines and apparatus, is one of the latest achievements of science in machine tool production. It works because of variable duration impulses. Pulse duration is about 1.5 milliseconds. Electromechanical servo-drives have been used in machine tools during the past decades. The servo-drives of the first generation were built by using high speed motors. To generate the relatively high forces that are needed in metal forming, seat belt connected to screw for converting rotary motion of the slider into translational were used in these designs. Recently, several press designers, mainly in Japan and Germany, have used servo-drives in machine-tools for sheet-metal treatment. It made possible to increase precision, accuracy and reliability of a mechanical press. This technology allows optimizing stamping operations, namely:

- to increase productivity;
- to control the velocity of parts deformation which reduces friction, improves product quality and reduces the percentage of finished parts defects;

– to reduce impact of speed and noise:
– to increase tool life;
– to allow the running of secondary operations on the same press by slowing down or stopping the press slide in its working position to provide additional tool motions.

Thus, the development of equipment for metal forming is not static, existing methods are improved and new methods of treatment are created, that is the prospect for the development of mechanical engineering in general.

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V. Shamrai, PhD student
V. Korobiychuk, PhD in Engr., Ass. Prof., research advisor
S. Kobzar, Senior lecturer, language advisor
ZhytomyrState Technological University

THE STUDY OF THE INFLUENCE OF POLISHING BY DIFFERENT METHODS ON THE QUALITY INDICATORS OF NATURAL STONE SURFACES

*Background.*The operating parameters of natural stone products are defined by the state of treated surfaces, their roughness, reflecting ability (gloss), depth of the defect layer. The stone gloss is largely determined by the polishing technology snd namely by the process parameters of fine and superfine grinding-polishing [1 p. 106].

In some cases, the required quality is ensured by superfine diamond grinding operation at the manufacturing of decorative and art goods and jewelry from natural stone. To provide gloss, the protection means and the means of impregnation of natural facing stone are also used. But their impact on treated surfaces is scantily explored.

The aim is to study patterns of influence of polishing by different methods on Pokostovskiy granodiorite gloss.

To process the plates the flat surface grinder was used with the following technical characteristics (Table 1).

Table 1

Specifications of flat surface grinder

Specifications	Value
Water consumption	30 l / min.
The speed of rotation of the head	1460 rev. / min.
The speed of lifting of the head	1.98 m / min.
The speed of the carriage	3.96 m / min.

Fikerts with different numbers and granularity (shown in the table 2) were used as diamond tools. The number of processings by those numbers is also shown. Such scheme of using the diamond tools allows to obtain a high-quality surface of the stone and to ensure its gloss. Gloss of Pokostovskiy granodiorite corresponds the second category as for reflectivity (GOST 9479-84) and is provided by this textured finish.

Table 2

The characteristics of diamond tools

The number of processing	Tool number	Granularity, micron
1	№ 240	200/160
4	№ 400	80/63
2	№ 600	60/40
2	№ 800	40/28
2	№ 1200	28/20
2	№ 1500	20/14
2	№ 2000	10/7
2	№ 3000	5/3
1	Polishing	1/0

Besides automated mechanical processing of the surfaces of Pokostovskiy granodiorites, the polishing powders - oxides of chromium and aluminum were used. The graph of dependence of gloss acquisition on the time of polishing by chromium oxide and aluminum oxide (Fig.1) was formed.

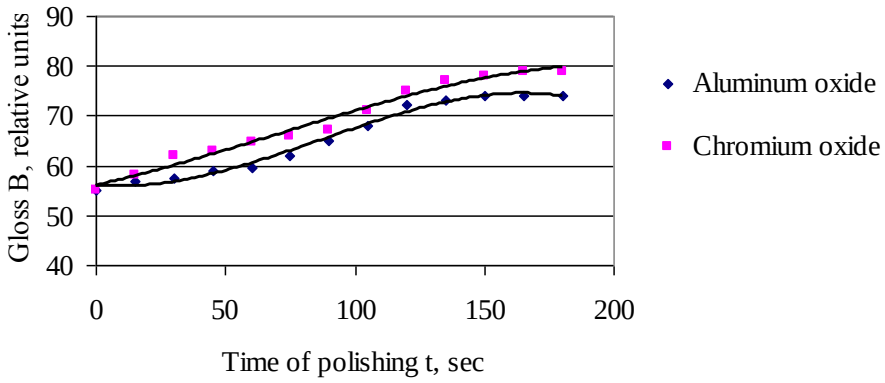

Fig. 1. The graph of dependence of gloss acquisition on the time of polishing by chromium oxide and aluminum oxide

The graph shows that Pokostovskiy granodiorite is better polished by chromium oxide. Marginal stone gloss is achieved in just 165 sec. The stone surface, which polished by aluminum oxide has less gloss and does not change after 150 sec polishing. Depending on the time of polishing by chromium oxide (1) and aluminum oxide (2), the gloss acquisition can be described by the following relationship:

$$B = -3 \cdot 10^{-6} \cdot t^3 + 0.0007t^2 + 0.114t + 56.071 \quad (1);$$

$$B = -10^{-5} \cdot t^3 + 0.0026t^2 - 0.0466t + 56.075 \quad (2),$$

where B - gloss, relative units;

t - time of polishing, sec.

The characteristic feature of Pokostovskiy granodiorite is the variety of colors. Pokostovskiy granodiorite is extracted at 5 quarries, which have differences in the chemical, mineralogical composition and also have different impurities that impact on the color. Blue shades are formed due to the presence of tiny mineral (rutile, ilmenite) and gas-liquid inclusions. Potassium feldspar (microcline and plagioclase) give granitoids red and pink colors, more seldom cream, white and light gray. Plagioclase give granitoids white, light gray and gray to black colors, sometimes greenish, yellowish, and gray-green hue (due to micro-inclusions of green ferruginous silicates). It is related to secondary changes of plagioclases, the formation of chlorite, epidote. Dark-colored minerals, biotite, hornblende, pyroxene, have little impact on the overall perception of granitoids color, and only if their content is 15-20%, the rocks are gray or dark gray [2 p. 125].

Taking into account the variety of Pokostovskiy granodiorites, and using the proposed classification of stone in color and lightness [3 p. 58], we measured the gloss values of polished stone surfaces at mechanical polishing, depending on the types of Pokostovskiy granodiorite (Fig. 1).

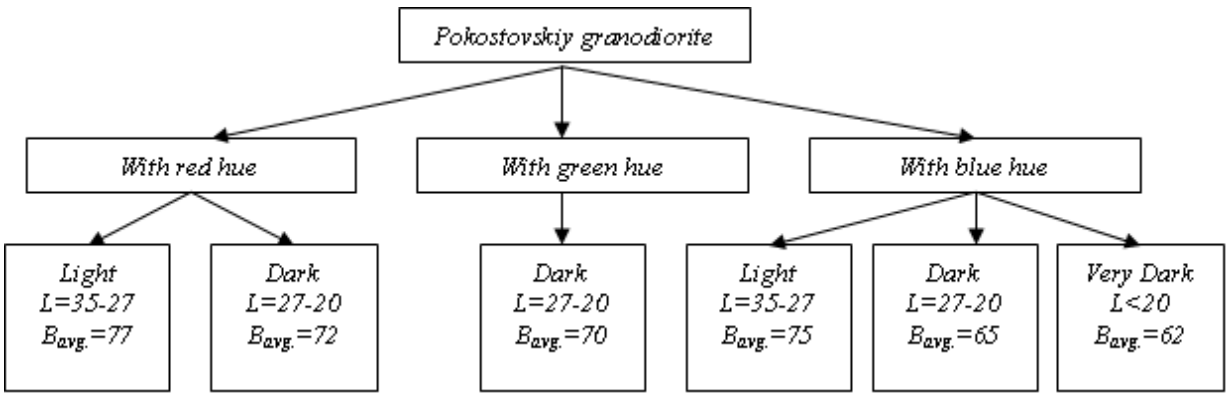

Fig. 2. Description of the main types of Pokostovskiy granodiorites at mechanical polishing, where L – lightness of stone, ed.; B_{avg} - medium gloss of stone samples, relative units.

As shown in Fig. 2, different types of Pokostovskiy granodiorites have different quality indicators. The light types of stones have the greatest value of gloss,

and the dark ones – the least. Taking into account the different features of types of Pokostovskiy granodiorite, in the future, the authors plan to consider the impact of chemical impregnating agents on the quality indicators of natural stone surfaces.

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D. Sheigas, Master student
A. Kryvoruchko, PhD in Engr., As. Prof., research advisor,
I. Orlovska, lecturer, language advisor
Zhytomyr State Technological University

DECORATIVE-FACING STONE MASSIF FISSURING RESEARCH

Natural stone is rather valuable decorative-facing material. Deposits of rock are characterized by a system of cracks (rocks fissuring). These cracks appear as a result of tectonic disturbances and under the influence of explosion in the massif.

The rocks fissuring system determines the choice of facing stone mining system technology and technological complex that may be rationally applied in these conditions.

The rocks fissuring plays a great role in decorative facing stone mining, because massif disruption limits the extraction of big stones (monoliths) from the deposit. That's why we should research the massif fissuring.

G. Kloos was the first to discover rocks fissuring of granite massifs and he created a morphological classification of primary cracks (rocks fissuring). Such scientists as L. Baron, M. Bakka [1,2-3], B. Belikov [4], O. Kosolapov [5], Yu. Karasiev [1,6], M. Motornyi, P. Natsyk, S. Podoinykov, A. Kryvoruchko [7], S. Iskov, R. Sobolevskyi also worked in this field. They researched natural distribution system of cracks (rocks fissuring) in the decorative-facing stone deposits.

A. Kryvoruchko clearly described the interconnection of rocks fissuring with structural features of massif [7]. These researches show that the intensity of rocks fissuring can vary in area as well as in depth of the deposit.

Nowadays the designing of mining technology in the decorative-facing stone deposits is carried out according to the average rate of rocks fissuring and blockiness.

Reliable information about the rocks fissuring and blockiness of the deposit allows defining the content and the outcome of stone blocks. It also allows determining the complexes of equipment for extraction and processing of decorative-facing stone.

In the research the structural features of Pokostivka granodiorite deposit were tested studying the core sample [1]. A core sample is a cylindrical section of rocks. Core samples are obtained by drilling with special drill. For example granite got by using a hollow steel tube is called a core drill.

When we drill core sample, we create a new cracks (rocks fissuring) which are difficult to distinguish from natural cracks.

That is why the interval of core sample drilling was established and it is 2 metres in depth. The average depth of core bit drilling is 30 metres.

According to the results of the cracks system elements measurements the rose-diagram (Fig. 1) was built. We can see that there are three main systems of cracks in the deposit of granodiorite (Tab. 1).

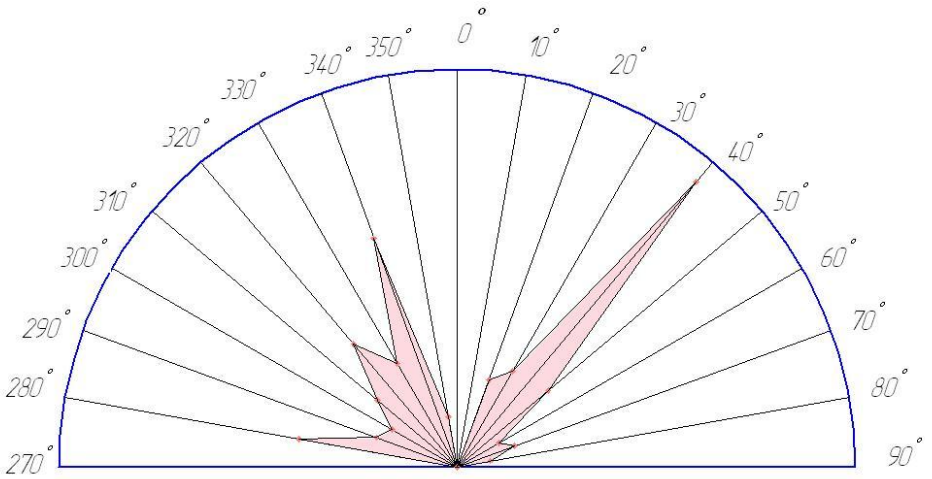

Fig. 1 Rose-diagram of rocks fissuring in Pokostivka granodiorite deposit

Table 1

The system of rocks fissuring in Pokostivka granodiorite deposit

System of cracks	Strick azimuth	Angle of dip
1	North East 30º-50º	70º -90º
2	North West 310º-340º	70º -90º
3	North East 55º -70º	0º-10º

The massif of Pokostivka granodiorite deposit is characterized by average rocks fissuring of tectonic origin, the reason of which is the anisotropy of massif structure.

It is necessary to mention that cracks are located heterogeneously, so blockiness of the massif will vary on different areas.

According to heterogeneous of cracks (rocks fissuring) we need to choose such scheme of natural facing stone extraction, in which the maximal coefficient of blockiness will be obtained, and unavoidable losses will be at a minimum level.

Thus, it is possible to make a conclusion that the research of the massif structural elements should be done to provide the correct mining extraction of decorative-facing stone. On basis of investigations we can set the coefficient of the blocks outcrop on different technological areas and carry out the geometrization of deposit.

That will help to pick up a rational system of natural facing stone extraction. It will also be possible to predict the outcome of blocks and the front of mining operations progress.

As the result the losses of decorative-facing stone raw materials in the process of extraction will decrease and the quality of raw materials blocks will increase.

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K. Skakun, Master student
V. Loyev, PhD in Engr., Prof., research advisor
L. Fursova, Senior lecturer, language advisor
Zhytomyr State Technological University

REMOVING OF SELF-UNTWISTING AND WEAKENING OF TIGHTENING EFFORTS IN CORRESPONDING BOLTED CONNECTIONS OF JOINTS OF METAL-WORKING LATHES

While working under load a bolted connection may become weak as a result of two processes, namely, by reducing the effort of tightening caused by settling and fluidity, or as a result of a self-untwisting bolt or nut, due to the relative movement of these elements.

According to two possible causes of a prior tightening effort reduction some locking elements are used. Such elements are divided into two groups by purpose (removal of sediments and removal of self-untwisting) and into four subgroups based on a design (spring elements, the elements with geometric locking, the elements with power locking, the elements using glue).

It is known that the bolted connections which are statically loaded, don't require compulsory locking, because they possess self-locking. At the same time, additional locking is compulsory for the screw-thread connections which are dynamically loaded.

There are two basic ways to eliminate self-untwisting (locking). The positive (or hard) locking takes place when the part that stoppers is connected to the part that is stoppered by a hard link which is called a stopper; unscrewing of a stoppered component is impossible without shear, fracture or deformation of a locking element. This method includes locking with pins, with washers, with knitting wire, with various locking mechanisms.

The second method is to create increased friction between the component which stoppers and the component that is stoppered. This method is called the friction locking & includes locking with lock nuts, with elastic washers, with self-locking nuts. The friction locking is less reliable than positive. There is always a danger of a friction force reduction and, as a result, weakening of a connection happens.

The weakening as a result of settling may occur even at a room temperature immediately after assembly. Under the settling we understand the jam (alignment) microasperities on the surface of a thread connection and on the basic side of a nut or a bolt head.

According to various causes of weakening of the previous tightening, it's necessary to take the following steps:

- elimination of settling, that is, the increase of connection susceptibility in the entire range of the previous tightening efforts;

- elimination of settling aims to minimize decrease in the previous tightening efforts that are caused by expected settling or fluidity of relevant materials of a connection. This can be achieved by increasing compliance of bolts or fasteners. The corresponding design and the application of the previously tightened elastic elements can provide great malleability. The third way that ensures the necessary after-tightening efforts is the fact that the efforts of the previous tightening of a bolted connection are selected based on expected settling.

To compensate settling it's also possible to use materials with shape memory. They are the metal alloys which undergo martensitic transformations that cause unusual physical and mechanical properties (shape memory effect, super elasticity, high damping capacity, etc.). This class of materials received the common name alloys with shape memory effect (SME). The essence of use is the application in screw-thread connections of such materials pre-heated above the temperature of martensitic transformation. After cooling the material remembers its form, if you deform the material and then heat it to the temperature of reverse martensitic transformation, the material will change to its original form, thus, compensating the settling.

We are going to develop a variety of structures and mechanisms to prevent the self-untwisting and compensating of settling in screw-thread connections and we plan to study their efficiency as well.

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A. Solovyov, Master student
V. Loyev, PhD in Engr., Prof., research advisor
L. Mohelnytska, PhD in Phil, Ass. Prof., language advisor
Zhytomyr State Technological University

THE METHODS OF INSTALLATION AND ADJUSTMENT OF HIGH PRECISION MACHINE TOOLS

To achieve high precision metal processing on machine tools we need to use different methods of equipment installation. Influence of the machine tool installation parameters on the deformation of the carrier system depends on the construction of the equipment. Special attention should also be paid to the vibration isolation of the machine tool. Precision equipmentis characterized by dynamic disturbancesthat occurin the process ofcuttingmetal parts.

Vibration isolation of machine tools, just like other equipment, is carried out through installation of the equipment on an elastic foundation. However, this method only applies to the installation of small-sized machine tools. The choice of the

installation method depends on the fluctuations arising on the location of the machine, cutting quality requirements and the features of the equipment. Further more, the machine tool installation method depends on the rigidity of the machine element. To determine whether you can apply one or another way to install a machine tool, it is necessary to determine the range of the relative movements of the tool and workpiece, which affects the accuracy of cutting metal.

With the help of the formulas we can determine the number of natural oscillations of the foundation with machine tool, as well as the amplitude of these oscillations.

The number of vertical oscillations:

$$n_z = 30 \sqrt{\frac{C_z \cdot F}{M}} \text{(per minute)}.$$

The number of horizontal oscillations:

$$n_x = 30 \sqrt{\frac{C_x \cdot F}{M}} \text{(per minute)}.$$

The number of rotational oscillations:

$$n_\varphi = 30 \sqrt{\frac{C_\varphi \cdot F}{M}} \text{(per minute)}.$$

The amplitudes of the forced oscillations are determined by the following formulas:

$$A_z = \frac{9 \cdot P_z}{M \cdot (n_z^2 - n^2)} (mm);$$

$$A_x = \frac{9 \cdot P_x}{M \cdot (n_x^2 - n^2)} (mm);$$

$$A_\varphi = \frac{9 \cdot P_\varphi}{M \cdot (n_\varphi^2 - n^2)} (mm).$$

When designing the foundation for the machine tool it is necessary to know about soil properties that influence the foundation deformation and fluctuations. Soils are divided into clay, sand, coarse and rocky. Before creating the foundation it is necessary to have all the information about a particular type of soil. It is necessary to analyze the density of the soil, its humidity, consistency, etc.

The objective of the paper is to identify the best installation methods for precision machine tools. The paper also presents an analysis of new types of vibration isolation and materials that are used to create the foundation. In particular it is a polymer concrete - a composite material consisting of quartz, granite chips and thermoactive organic compound.

UDC 574:630

I. Sverchevska, Master student
V. Krasnov, Dr. of Agr. Sc., Prof., research advisor
S. Sukhovetska, Senior lecturer, language advisor
Zhytomyr State Technological University

FEATURES OF RADIOACTIVE CONTAMINATION OF FORESTS AND FORESTRY PRODUCTION OF THE STATE ENTERPRISE «KOROSTEN FOREST-HUNTING ENTERPRISE»

Forest massifs of the state enterprise «Korosten forest-hunting enterprise» are located within «the western track» of emissions after the Chernobyl NPP catastrophe; and the radioactive contamination of the area was caused mainly by $^{134+137}$ Cs. Investigation of the forests of this forestry enterprise was carried out in 1991. One (of five) mixed sample of soil was taken per 100 ha of forest plantations during the investigation. As far as forest blocks of the state enterprise «Korosten forest-hunting enterprise» in most cases have smaller areas, the results of the survey showed the rates of the soil radiation contamination density for 60 − 70% of these areas.

The analysis of the obtained data (Table 1) allows to draw conclusions that there is no forests with radiation contamination density of soil more than 15 Ci/km^2 on the territory of this forestry enterprise. But these territories are prohibited to conduct any forestry activity. Thus, there are no areas in the state enterprise to be imposed restrictions concerning the stay of workers in the forests in extreme cases (suppression of fires).

Table 1

Distribution of the areas of forest plantings of the state enterprise «Korosten forest-hunting enterprise» according to the density of soil radiation contamination by $^{134+137}$Cs, (Ci/km^2)

Forestry	Area of zones, ha					Total, ha
	0,01–2,0	2,01−5,0	5,1–7,0	7,01–10,0	10,01−15,0	
Bekhy	2576,7	2541,5	1446,0	807,6	230,0	7602,0
Omelyanivka	2050,3	2976,1	337,6	−	−	5363,6
Turchynivka	3440,0	150,0	−	−	−	3590,0
Ushomyr	3895,6	2698,8	210,0	265,0	−	7069,4
Shershniv	5259,0	962,0	−	−	−	6221,0
Total	17221,6	9328,4	1993,4	1072,6	230,0	29846,0

Two hundred and thirty ha of forest plantings with soil radiation contamination density of 10,01 – 15 Ci/km^2 are concentrated in the north-eastern part of Bekhy forestry. The provision of wild berries, herbs and edible mushrooms as well as wild game animals shooting (wild boar, European roe, elk) is completely prohibited here.

Besides, there are some restrictions (provision of firewood) in the forest massifs with mentioned radiation contamination density of soil.

3296,0 ha of the state enterprise «Korosten forest-hunting enterprise» forests were introduced the ban to use non-timber forest products. These forest plantings with radiation contamination density of soil more than 5 Ci/km^2 occupy 11,0% of the forestry enterprise total territory. Forest plantings with soil radiation contamination density of 2,01 − 5,0 Ci/km^2 which occupy an area of 9328,4 ha (31,3%) are permitted for provision of non-timber forest products but only with required radiation control. Restrictions to carry out silvicultural activity and to use forestry production were not imposed in the area of 17221,6 ha.

It is necessary to mention that the current radiological situation in the forests of the state enterprise «Korosten forest-hunting enterprise» has significantly improved. It is due to the disintegration of the main dose-forming radionuclides. Large volumes of wood that serve as a raw material for manufacturing various wood products to use in national economy of the state and abroad are produced in the forest massifs of this forestry enterprise. Because uncontrolled use of wood can cause overexposure of consumers it requires systematic radiological control of radiation contamination levels.

The data obtained from the survey of radiological control (Table 2) prove that the wood products of the forest enterprise can be considered relatively «pure» from the radioecological point of view.

The analysis of data showed that the lowest levels of radiation contamination are characteristic for processed timber. The radiological control of 18 lumber samples was carried out: 7 samples with ^{137}Cs specific activity less than 50 Bq/kg (38,9% of the total number of samples of this product type); and 11 samples with specific activity ranging from 50 to 100 Bq/kg (61,1% of the total number of samples of this product type). Lower levels of radiation contamination were detected in samples of wood without bark, plywood raw material, pulpwood, raw material for fasteners works and technological wood comparedto other types of wood products which were subjected to radiological control in 2012. The radiocesium specific activity in samples of mentioned types of wood products of the state enterprise «Korosten forest-hunting enterprise» did not exceed 100 Bq/kg. Somewhat higher levels of radiation contamination were observed in samples of wood with bark. The results of radiological control showed that ^{137}Cs specific activity ranged from 100 to 200 Bq/kg in 18% (off the total) of samples of wood with bark.

Considerably higher levels of radiation contamination were observed in samples of fuel wood (firewood). Thus, radiological control of 58 samples of this type of wood product was carried out: 13,8% of samples showed 400 Bq/kg specific activity of this radionuclide; 5,2% of samples – in the range of 300 − 400 Bq/kg; 34,4% of samples − in the range of 200 − 300 Bq/kg; and 5,2% of samples − ranging from 100 to 200 Bq/kg. The specific activity of radiocaesium did not exceed

100 Bq/kg (Table 2) in 41,4 % of samples (off the total amount of fuel wood (firewood)).

Table 2

Distribution of wood samples and wood products according to the ranges of ^{137}Cs specific activity in the state enterprise «Korosten forest-hunting enterprise» in 2012, (Bq/kg)

Type of production	Number of samples, units						The total number of samples, units
	< 50	50−100	100–200	200–300	300−400	>400	
Timber in the rough							
Wood with bark	9	9	4	–	–	–	22
Wood without bark	–	9	–	–	–	–	9
Plywood raw material	5	14	–	–	–	–	19
Pulpwood	5	18	–	–	–	–	23
Raw material for fasteners works	–	7	–	–	–	–	7
Technological wood	6	18	–	–	–	–	24
Processed timber							
Lumber	7	11	–	–	–	–	18
Production of economic, cultural and household goods							
Fuel wood (firewood)	–	24	3	20	3	8	58
Total	32	110	7	20	3	8	180

In 2012, the examination of 180 samples of wood and wood products of forestry enterprise was carried out. There was no sample detected with ^{137}Cs specific activity exceeding the established admissible levels.

It should be noted that the data relating to radiation contamination of non-timber forest products in the state enterprise «Korosten forest-hunting enterprise» in 2012 are absent. It is critical from the radioecological point of view and can not be considered as a completely satisfactory radiation control of forestry production.

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T. Trotsenko, PhD student
R. Sobolevskyi, PhD in Engr., research advisor
S. Kobzar, Senior lecturer, language advisor
Zhytomyr State Technological University

REVIEW AND ANALYSIS OF 3D IMAGE-BASED MEASUREMENTS

Image-based methods can be used for the analysis of the whole deformation field of a body by tracking a vast number of points distributed on the object. Images contain all the information to derive 3D measurements from multiple 2D image coordinates with limited cost and good accuracies. In fact, image-based techniques have been used in several applications which involve the determination of the shape of a body and its changes, with satisfactory results in terms of completeness, precision and time [1, pp. 599-604; 2, pp. 268-276; 3, pp. 181-189; 4, pp. 441-446]. They are also known as vision metrology applications. Some commercial cameras (or photogrammetric ones), tripods, light sources and synchronization devices are the components needed to obtain high precision of 3D measurements for a large number of points. However, the extraction of 3D information from 2D images is not a simple issue and the algorithms for image processing must be developed in order to obtain an automated elaboration.

The goal of image-based methods in material testing is the estimation of accurate 3D coordinates starting from 2D measurements in the images through a perspective mathematical formulation between the object and its projection into several images. Some commercial software allows the analysis of the dynamic changes of several targets distributed on the object in a fully automatic way, but if markerless images are employed no commercial automatic solutions are available on the market.

Moreover, the procedure becomes a full-field non-contact technique only without targets, when the natural texture of the object is directly used (generally after the preliminary enhancement with filters that modify the local contrast of the image).

Basically, the precision achievable with image-based techniques depends on the size of the investigated elements [5, pp. 39-46]. For experiments in the controlled environment a standard deviation of the object coordinates should not be more than 1:100,000 of the largest object dimension, but during the analysis in the repeatable system configurations (e.g., with fixed cameras) a precision of 1:250,000 has been achieved [6, pp. 145-152; 7, pp. 133-140]. In [8, pp. 205-217] a hyper redundancy

network is used for the study of the deformations of a radio telescope, with an accuracy in the range of 1:580,000 to 1:670,000 obtainable through the use of more images than those strictly necessary. In film-based photogrammetric measurements of big antennas this idea has led to an accuracy approaching one part in a million [9, pp. 305-310].

As the technological development of commercial low-cost cameras is rapidly increasing, image-based methods and low-cost software are commonly used in several sectors with good results in terms of precision. However, photogrammetric methods have a limited use. This is mainly due to the lack of automatic processing algorithms and user-friendly software, especially in the case of markerless images.

Some low-cost digital cameras and targets can be a convenient solution for the analysis of the whole surface of an object. The employed targets can be really inexpensive (a piece of white paper with a black mark is sufficient for many applications), while in the case of more exhaustive experiments they can be printed on metal plates or can be made of retro-reflective materials. The centre of the target can be automatically measured with a high precision (up to ±0.01 pixel) in a fully automated way, improving the precision of the corresponding 3D coordinates.

A group of targets permanently fixed on the object provides a regular mesh for all deformation analyses. These dense points can approximate the deformation field of the whole body. A fundamental advantage of an image-based method is the possibility of analysing more targets than those strictly necessary, without increasing the cost of the test and with a limited worsening of the processing time.

However, in some applications targets cannot be employed and automatic methods based on the natural texture of the body must be developed. This kind of analysis is more complicated, especially in the case of bad surfaces without details. This fact limits the use of image-based methods.

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S. Tysiak, Master student
V. Podvysotsky, PhD in Geology, research advisor
S. Sukhovetska, Senior lecturer, language advisor
Zhytomyr State Technological University

THE USAGE OF INDICATOR MINERALS IN DETERMINING OF THE DIAMONDS PRESENCE IN KIMBERLITE PIPE

There exists an important issue in diamond exploration processes: how to improve the exploration stage and quickly differ between empty and fertile diamond kimberlites. The best decision is to use indicator minerals. Structures ofindicator minerals, such as Mg-ilmenite, chromite, garnet and diopside, are associated with thediamonds presence in kimberlites. Nevertheless, research made by Robles-Cruz (2008) showed that mineral analysis on ilmenite is not suitable for determining diamonds in some kimberlite pipes. But still, it is important to know the chemical analysis of indicator minerals in exploration.

Such researchers as *M.C. Oliver, J.C. Melgarejo, A.O.Goncalves* (2011), K.N.*Egorov, E.F. Roman'ko,V.T., Sablukov, S.M., Garanin, V.K., and professor of our university V.T. Podvysotsky* worked on this issue *(2007).* My research is based on the analysis of scientific works of mentioned above researchers. Their research was performed on fertile and empty kimberlite deposits in Angola (2007 and 2011). Fourkimberlites were sampled, twofrom the Lunda province (NW Angola) and two from Bié (the centre of Angola) [1]. Such indicator elements as chromite, ilmenite, garnet, Cr-diopside and perovskite were found. So, how can we use these minerals to prove or refuse diamonds presence in researched kimberlite pipes?

In the first place we shall discuss the location of these four pipes. The given pipes are located on the extensionaltectonic structure which stretchesfrom NE (Lundas) to SW (Namibe) for more than 1100km. These pipes are assumed to beCretaceous and kimberliticeruptions were noticed therein 2010 [1]. All geologists know that active volcanic zones are necessary condition for diamond forming. Thus,

according to the research made by Spain scientists: *M.C. Oliver, J.C. Melgarejo, A.O. Goncalves* (2011) we can predict that four kimberlite pipes from Lunda and Bie provinces can be diamondiferous. However, to prove presence of diamonds in researched kimberlite pipes we need to examine the texture and geochemistry of indicator minerals.

The first found indicator mineral is *chromite*. Four types of chromite were found: *chromite as olivine inclusions* (smallcrystals <30μm), *atoll chromite* (5 μm), *fine grained chromite in xenoliths* and *euhedral chromite in xenoliths* [1].It is known that fertile pipeshave low TiO_2 and high Cr_2O_3 content [2]. But the research on chromite showed increased TiO_2 and decreased Cr_2O_3 contents. Thus, we can make a conclusion that chromite in investigated pipes does not prove the presence of diamond grains.

One more found indicator element is *ilmenite.* Four textural kinds of ilmenite were characterized by Spain researchers: *anhedral ilmenite xenocrysts* (size from 50 to *600*μm), ilmenite *with spinelinclusions, ilmenite exsolutions in spinel,* ilmenite *cumulates* [1]. *M.C. Oliver, J.C. Melgarejo, A.O. Goncalves*(2011),proved thatilmenite grains have ahigh Mg content, thus, they are included in the"kimberlitic" ilmenite-field in the MgO-TiO_2diagram (Wyatt, 2004)[3]. However, ilmenite with spinel inclusionsfalls out of this field [1]. Considering mentioned above facts it is not certainly that ilmenite is a useful mineral for determining presence of diamonds in researched kimberlites.

Garnet, one more indicator element, can occur both as xenocrystand inside a xenolith [1]. They also occur in many other types of xenoliths andtherefore, can give more information onthe composition and characteristics of researched kimberlite pipes. Research data showed that garnet is usually very poor in Cr_2O_3 (<1wt %) and has a wide range of CaOcontent (1.23-14 wt %) [1]. These conditions are favorable for diamonds presence in kimberlite pipes. However, according to the research there is a lack oflherzolite and harzburgite garnets, which can be explained by insufficient sampling [1]. Thus, because of this reason we can not prove the presence of diamonds in Angola kimberlite pipes.

*Cr-diopside*is also an important indicator element in the research of diamond presence. Only few diopside grains werefound. However, 3 different textural types of diopsidecould are distinguished: *clinopyroxene in xenoliths* (foundcommonly with garnet in deep xenoliths), *groundmass diopside* (grainsize ranging from 20 to 100 μm), *Groundmass skeletal diopside* [1]. The research showed different geochemical types of clinopyroxene minerals: those with Cr_2O_3>1wt%, and those with lower content of Cr_2O_3. Decreased content of Cr_2O_3 witnesses to presence of diamonds in kimberlite pipes. This indicator element proves the availability of diamonds in kimberlite pipes in Angola.

The last researched indicator element is *perovskite.*Only some small (<40μm) perovskitegrains were found in samples [1]. All perovskite grains are kimberlitic [1].

But we can not use this indicator element for proving the presence of diamond, because the amount of found elements is too small.

For better understanding of the usefulness of given indicator elements some conditions essential for akimberlite to be diamondiferous should be considered:

- sample rock must be fertile (C-source must be present) [1];
- prolonged oxidisingprocesses should be absent at high temperature during the kimberlite formation [1];

The geochemicalcomposition of the indicator minerals was studied independently on their texturalfeatures. The criterion of indicator mineralstudy is suitable only for Cr-diopside. Thus, to have efficient results the textural features of these elements should be studied. But it is the topic for further investigations.

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L. Varizhuk, Master student
Z. Shelest, PhD in Biology, Ass. Prof., research advisor
N. Kurnosova, PhD. in Phil., Ass. Prof., language advisor
Zhitomir state technological university

RENEWABLE ENERGY SOURCES AND THEIR POTENTIAL IN UKRAINE

It is considered that a comprehensive use of the renewable energy sources (RES) which have huge resources is one of the most perspective directions of power production development in the 21st century.

RES (resources that are replaced by natural process and can be used forever) include tidal, geothermal, hydro, solar and biomass energy. In Ukraine there are favourable natural conditions for developing RES production. Wind power is an important part of overall RES for the future. Modern wind mills have become very efficient at transferring the energy of wind to electricity. Due to favourable wind conditions an intensive wind development has taken place in Ukraine. At present, there are eight wind power stations in the Crimea, Priazovye and in the Carpathian region.

Power generation projects also include hydropower generation. Nowadays, hydropower supplies about one-fourth of the world's electricity. Ukrainian hydroelectric power plants produce about 30 TW/h. Small-scale hydroelectric plants on small rivers were found to be more perspective in terms of production cost. They make only a small contribution because of the lack of suitable sites, high production costs and irregular output that varies daily.

The use of solar energy can be divided into two main directions: to generate heat, and to generate power. The annual technically achievable energy potential of solar energy is equivalent to 6 million. t. of conditional fuel. In Ukraine the average annual quantity of the total solar radiation coming upon 1 sq.m of surface ranges from 1070 kW h/sq.m in its northern part to 1400 kW h/sq. m and in the south.

Biomass power is used in bio-energetics in burning, pyrolysis, gasification, an anaerobic fermentation with formation of methane, production of alcohols and oils to receive engine fuel. In Ukraine biomass is mainly used to produce heat and/or hot water by burning. The technical potential of biomass use ranges from 126 to 162 TW / h or 195 TW/h. It is believed to be more cost efficient and less detrimental to the environmental.

The main sources of geothermal energy are: Earth normal superficial heat at the depth from several tens to hundreds meters; hydrothermal systems; the parogidrothermal systems; petrogeothermal zones or dry rocks heat; magma. In Ukraine the most wide-spread and developed is geothermal energy in hot water reservoirs. It's technical potential is roughly estimated at 100 TW/h.

Ukraine has enough RES to supply all its needs forever; however, the challenge is to develop the capability to effectively and economically capture, store and use the energy when needed.

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O. Yatskova, Undergraduate student
L. Kovalevych, Senior lecturer, research advisor
I. Orlovska, lecturer, language advisor
Zhytomyr State Technological University

PROBLEMS CAUSED BY THE ROCKS SHIFTING PROCESS AND FACTORS THAT AFFECT IT

The dredging of coal layers and other fossil minerals forms the cavities of considerable sizes in the Earth's interior. The rocks that occur at the surface of the mine workings may move by the action of gravity and rock pressure, causing the faulting of all strata, including the Earth's surface.

As the result of faulting and deformation of the entire thickness of rocks violated the integrity of mine workings fixing is disturbed. The objects located on the earth surface are deformed or can be collapsed (there are cracks on the walls).

The rocks that lie above a longwall are released from the pressure of the above lying rocks, and the above lying rocks lose the support. As a result the natural balance of rocks around the longwall is broken, they are moved and deformed. The increase of load on clearing pothole is carried out, mainly, due to the increase in speed of their motion that directly affects the deformation processes in the mountain massif and the duration of the landslide process.

The subsidence of the earth's surface above the mining workings is one of the most important impacts of mining operations on the geological environment. The reduce of engineering and geological rocks stability, the non-densifying of rock massif lying over underground workings, the redistribution of tension round the developed space in a massif, the waterlogging of large areas, the flooding of buildings and structures are connected with the development of this process. The subsidence of the earth's surface above the mining workings is also linked to the rocks collapse (in many cases - complete) above the mining workings at which the breach of continuity with the formation of new fracturing zones takes place.

The faulting of the rocks thickness and the earth's surface caused by underground mining depends on many factors. The main of them are the tectonic disturbances and movements; the angle of inclined layer; the watering of rock strata; the power of extracted layer and the depth of mining; the system of working; the speed of coalfaces movement; the breach of rock strata; the power of pumps and the relief.

To avoid all these problems we should know the rules of the rock strata and the earth surface faulting processes. It is necessary to examine the peculiarities of this processes, perform calculations of the faults and deformations that occur both at the earth's surface and in the objects, build the preventive pillars of optimal sizes that do not allow the unnecessary loss of minerals.

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P. Zagurskii, student
I. Kotsuba, PhD in Engr., Ass. Prof., research advisor
S. Kuriata, Senior lecturer, language advisor
Zhytomyr State Technological University

ZU DEN PROBLEMEN DER AUFBEWAHRUNG DER UMWELT IM BETRIEB "ZHYTOMYRFLEISCHKOMBINAT"

In der Ukraine gibt es zurzeit ein großes Problem: die Zahl der nichtarbeitende Unternehmen und Betriebe. Nicht jeder Region der Ukraine kann die industrielle Region genannt werden. Der Betrieb „Zhytomyrfleischkombinat" ist einer der immer arbeitende Betriebe unserer Region.

Es wird betont, dass vor einigen Jahren im Aufenthalt dieses Betriebes nicht wohnen, spazieren gehen, atmen konnte. Das war schrecklicher üblerer Geruch. Die Ursache diesen übleren Geruch, der sich auf etwa zwei Kilometer ausgedehnt hat, war der Mengel von leistungsfähigen Filtern. Im Betrieb „Zhytomyrfleischkombinat" werden typische für den großen Unternehmen Filter, wie „Cyclone" und „Taschenfilter", verwendet. Es wird festgestellt, dass diese Filter die Atmosphäre von 60% bis 80% reinigen können.

Gegenwärtig wird dieses Problem erfolgreich gelöst. Einerseits, wurden die modernen Filter eingestellt und als Ergebnis gibt es keinen übleren Geruch mehr; andererseits, werden viele schädliche Stoffe in die Atmosphäre ausgeworfen. Es scheint, dieses Problem könnte in der Epoche der neuen Technologien und zahlreiche Untersuchungen im Bereich der verarbeitenden Industrie leicht gelöst werden.

In meiner Analyse wird die Hauptaufmerksamkeit auf zwei Probleme jedes großen Betriebes der Fleisch- und Fleischwahrenverarbeitung gerichtet.

Erstens: die Toxizität der schädlichen Stoffe.

In der Regel werden Ammoniakkompressoren für Fleischkühlung und Fleischkonservierung verwendet. Als Schadstoff tritt in diesem Fall Ammoniak, das durch die Nichtabdichtung der Kompressoren und die nichthermetischen Rohrleitungen ausströmt.

Zweitens: die Auswürfe in die Atmosphäre.

Es gibt sechzehn stationäre Emissionsquellen im Betrieb "Zhytomyr fleischkombinat". Die wichtigsten Schadstoffe, die in die Luft ausgeworfen werden, sind: Stickstoff (N), Kohlenmonoxid (CO), Quecksilber (Hg), Mangan (Mn) und die Manganoxiden, Methan(CH4), Ammoniak(NH3), Phenol(C6H5OH), Chlor (Cl), Holzstaub, Asche.

Es wäre sehr nützlich, hätte in Zhytomyrer Region eine Monitoringabteilung in Umweltschutz organisiert. Diese Abteilung könnte viele Aufgaben erfüllen, wie, zum Beispiel:

- die zentrale Einführung von den Systemen der Monitoringuntersuchung in jeden einzelnen Betrieb;

- die Sammlung und die Analyse der Information über die Umweltverschmutzung;

- das Vornehmen Änderungen und Vorschläge in die entsprechende Behörde über die Verbesserung der Umweltschutz.

Es soll gesagt werden, dass der Betrieb "Zhytomyrfleischkombinat" die ersten aber kleinen Schritte in dieser Richtung schon unternahm. Der Betrieb ist fertig die Monitoringabteilung zu haben, aber für ihre qualitative und erfolgreiche Arbeit man soll perfekte technisches und methodisches Basis sein.

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A. Zhuravskyi, Master student
I. Grabar, DScTech, Prof., research advisor
I. Orlovska, lecturer, language advisor
Zhytomyr State Technological University

MODELING THE CAR BODY DEFORMATION PROCESS DURING THE CRASH TEST

In this paper the identification methodology of decoding the crash tests results in a frontal impact is offered. Such D-segment automobiles as Honda Accord (USA), Lexus IS (Japan), Volvo S60 (Sweden), Mercedes-Benz C-Class (Germany) have been tested.

Time-lapse video decoding using the technical characteristics of cars (length, weight and speed at the moment of hitting a tough obstacle) reproduces the process of body elements deformation, plane-parallel movement of the car body after the impact and kinetics of the driver-mannequin's head and a front left wheel displacement.

While researching the analysis of the hitting a tough obstacle process was carried out. The external defects of automobile and kinetics of human movement in the car were also analysed.

According to the results of decoding the destruction process kinetics the mathematical model of car body deformation was built and the peculiarities for the above mentioned car brands were obtained.

The methodology of the time-lapse reconstruction of the car body deformation process was developed in the research. The creation of this technique made it possible to investigate the peculiarities of the car construction safety, plane-parallel movement of the car body and kinematics of the driver-mannequin's head movement and the front left wheel.

All measurements were transferred into real rates to estimate the process of car body and its components deformation.

For quantitative kinetic studies of car body deformation the dimensionless number of car body deformation that is a scalar measure for comparison of deformation and dynamic features of different models of car body configurations in crash tests was introduced.

Data processing and the results of experimental measurements helped to build mathematical models of car deformation process and the driver-mannequin's head movement having observed that tremendous pressure on the man in the car accidents.

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Session work №2

MODERN RESEARCH IN THE FIELD OF INFORMATION COMPUTER TECHNOLOGIES

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P. Bosoy, Master student,
I. Suhoniak, PhD, As Prof., research advisor
V. Shadura, Senior lecturer, language advisor
Zhytomyr State Technological University

THE OPTIMIZATION LOGISTICS MODEL FOR TRANSPORTATION GEOINFORMATION SYSTEM

The information system is a huge database of digital data, converted into digital format. They are detailed layers, united by geography sign and tied to a specific coordinate system. Any events can be successfully monitored in such database. In addition, it can be found almost anywhere in the world to track the movement of practically any object.

Geoinformation systems (GIS) are powerful tools for work and visual representation of information. GIS technologies provide new, more corresponding modernity, effective, comfortable and fast approach to analyze the problems and solve the tasks facing humanity both in whole and particular for an organization or a group of people. They are aimed to automate the analysis procedure and prognosis. Only few systems possessed the art of synthesis and analysis of geographic information and full analysis of geographic information before the application of GIS for the purpose of making optimal decisions to apply to modern approaches and vehicles.

GIS technology is not just a computer database. This is a great variety of opportunities for analysis, planning and regular information updating. GIS technologies are used today practically in all areas of life, and they really help to solve many problems effectively.

The development of models and methods of GIS design for transportation logistics, allowing optimization of transport routes and their effective monitoring are becoming of great importance at present. The aim of this work is the development and realization of optimization methods of logistic operations enterprise-carrier cargo and methods of monitoring the location of vehicles.

Clarke-Wright method is used to solve the optimization problem of transportation routes. This method is used because of great accuracy of calculations. The idea of the method is to design the optimum scheme for the delivery circular route step by step starting with the initial draft. I n order to achieve this, let us introduce a notion a kilometer gain. It is important to take into account that the more the items of cargo delivery, the more is the calculation time.Therefore, to simplify the calculations it is recommended expedient to cluster the item cargo delivery. It will also help to reduce the number of possible delivery routes.

The distance matrix D has to be calculated to applying the k-method. We form this using YandexMap data. It is performed to minimize objective function.

$$J = \sum_{i-1}^{n} \sum_{i=1}^{k} U_y^2 \left\| X_i - M_j \right\|^2 \qquad (1)$$

As a result of the following is obtained the derived cluster centers): - size matrix M and the preference matrix U (m - number of clusters; n - number of place; Uij - degree of preference the i-th place j-th cluster). The initial plan how to «download" vehicles cars is performed by the radial route considering the degree of cluster location preference.

The second step is a transition one that leads to the optimum scheme for the ring rout delivery The notion of kilometer gain is introduced here. In case of the radial transport routes in total the transport path equals:

$$L_A = d_{01} + d_{10} + d_{02} + d_{20} = 2d_{01} + 2d_{02} \qquad (2)$$

In the ring route path of a vehicle is:

$$L_b = d_{01} + d_{12} + d_{02} \qquad (3)$$

In general, the kilometer gain algorithm is expressed by:

$$S_{ij} = d_{0i} + d_{0j} + d_{ij} \qquad (4)$$

where

- Sij is the kilometer gain obtained in the association place i and j;

- d0i, d0j is the distance between wholesale basis points and i and j, respectively;
- dij is the distance between points i and j.

Clarke-Wright algorithm includes several of steps and allows analyzing the matrix kilometer gain for multitude of the sets of points. The focus (i *, j *) with the maximum value Smax is searched by means of this algorithm applying to the possible kilometer gain.

GIS prototype is implemented on the basis of the designed models. The project is developed using PHP language, MySQL database, Web Technologies Jquery, Ajax, Twittew Butstrap and Yandex map service. The system has a user-friendly interface; it is cross-platform compatible, client apps can be downloaded either from a PC or a mobile platform.

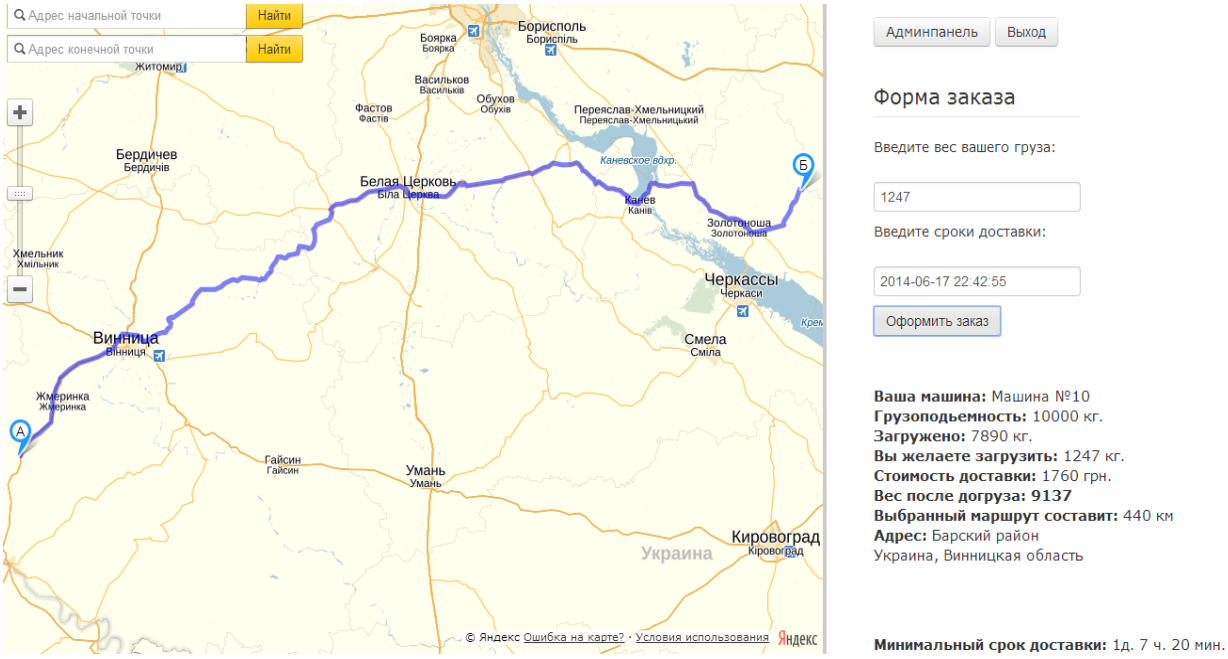


Fig. 1 General view of the system

The main features of the system are: the management vehicle transportation, finding the optimum way of traffic, the selection of the nearest to the starting point vehicle for transportation depending on criteria of search, the calculation of the route length, the transportation cost, the minimum delivery period and the review of the current information about cargo, which is in database. It is also possible to obtain the information about cargo for the definite periods of time and to add new vehicles as well.

UDC 621

Yu. Dederkal, Master student
D. Sikorsky, Master student
I. Cherepanska, PhD in Engr., Ass. Prof., research adviser
L. Mohelnytska, PhD in Phil., Ass. Prof., language advisor
Zhytomyr State Technological University

MECHANOTRONIC ROBOTIC DEVICE FOR PRODUCTION OBJECTS RECOGNITION

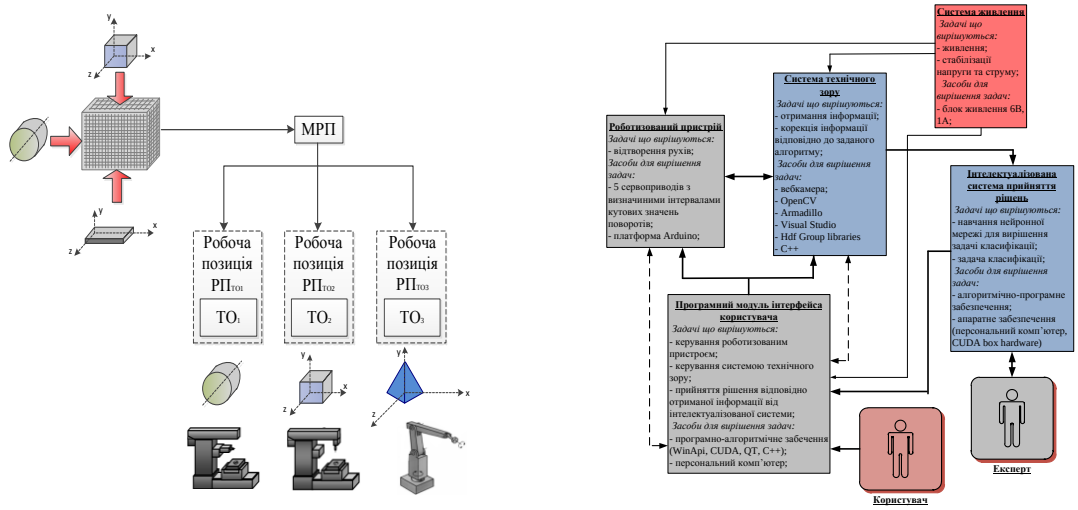
The rapid development of modern production requires the use of flexible, interchangeable systems, called flexible manufacturing systems (FMS). FMS are based on industrial robots (PR), which are designed to manipulate production objects (PO). Manipulation operations require previous recognition and spatial orientation, such as streamlining production environment. It is a difficult and time-consuming process. One of the ways to solve these types of problems is the use of robotics, mechatronics, and microprocessor technologies. The solution is based on the idea of mechanical, electronic and computerized elements interconnection. It allows us to create and exploit new mechatronic robotic devices (MRD) which are the basic elements of PR. Mechatronic module is a functionally and structurally independent unit aimed at automating the processes of PO recognition and manipulation.

To implement PO manipulation it is better to use MRD with algorithmic software.It can select from a plurality of separate production facilities, determine its location, grasp and transfer the PO in a given place. Because of a universality of MRD created on the basis of their flexible production systems we can achieve relatively high rates of flexibility and opportunities to process new products.

Building the MRD model for object recognition involves the production of functional interaction of production facilities and elements of MRD that can be the basis of the informational, software and technical support of developed MRD. For example, MRD for PO recognition can be designed as a functional sequence of automated modules, which are connected by information channels. Graphical interpretation of its functioning is in Fig. 1, a. MRD should recognize PO type(cylindrical, prismatic or pyramid), and move it in to their special places (Fig. 1,a). Organization structure of MRD for PR recognition is in Fig. 1,b.

The autovision system of MRD is based on artificial neuron networks (ANN). It takes input information about PO from webcam and transfers it as pixel matrix 160x120.These pixels are passed as input information for ANN.

According to the image dimensions, the input layer size consists of 19200 neurons. ANN output layer is formed accordion to the number of analyzed PO groups. According to the output group size output layer consist of 3 neurons. The size of the hidden layer is 10 neurons and it has been determined experimentally. ANN architecture is based on a multi-layer perceptron with back propagation. ANN structure is shown in Fig. 2.



a b

Fig. 1.Organization and functional structure of MRD

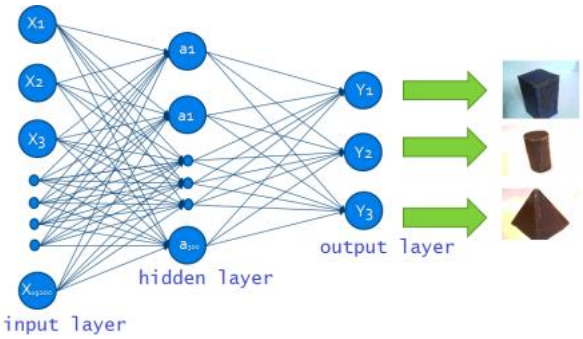


Fig. 2. ANN structure

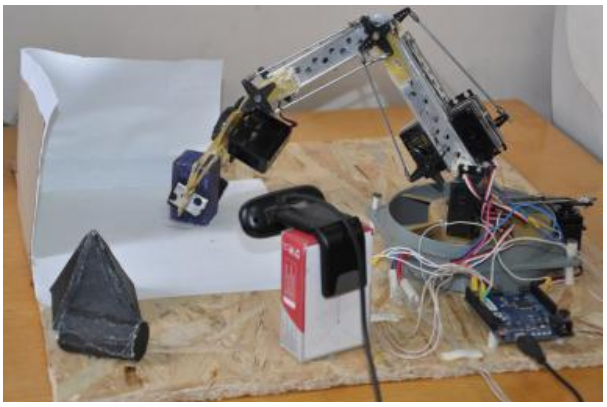


Fig. 3. MRD exterior

Software for manipulation and robotic device movement is implemented via Arduino IDE in C++-like language. ANN is built via Octave in MATLAB language. Graphic user interface is developed using Qt5.3 library in C++. To exchange information between modules MRD uses international standard HDF5. 5. MRD exterior is shown in Fig. 3.

A number of experimental studies confirmed the efficiency of MRD to detect PO and its suitability for use in the laboratory.

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Ye. Gryshkun, PhD student
A. Morozov, PhD in Engr., Ass. Prof., research advisor
S. Kobzar, Senior lecturer, language advisor
Zhytomyr State Technological University

CREATION OF MAPPING WEB-SERVER USING SOCKETS AND THE LIBRARY SHAPEFILE

Web-cartography is one of the most useful applications on the Internet, because it is easy to find a specific address or route with its help. You only have to open a website or download a ready-made solution to your mobile device. The information for end-users of the web-resource is provided by mapping service, which in its turn interacts with geo-server that provides the necessary map or its part.

At present the geo-server is being developed that will provide the user with the information about highways of Zhytomyr, will be able to find and solve the problem of finding the optimal path (total traveling salesman problem and its modifications).

Up for now, several modules have already been written, which are responsible for certain features of the software: TCP / IP server [1] that provides information via protocol *http*, the module for solving the general problem of the traveling salesman, and the modules to interact with the *shapefile* [2] (.dbf and .shp files) .

TCP / IP server has been written in Win sockets that send information to web-browser. The user addresses the server and receives in return a map or an error message if the request was wrong. Schematic inquiry looks as follows *http: // IP addres /*. In the future, using the service No-IP the server will be assigned a domain name.

Shapefile-file is the main part of the service that stores different types of geometric objects: points (polipoints), lines (polylines), landfills and other objects. Although the term *shapefile* is most often used, it is not just one file, but a set of files with the same name but different extensions. The basis of the format is three mandatory files: .shp, .shx and .dbf.

- *shp* is the main file. *shp* file contains the information about geometric objects. The file consists of fixed-length header and one or more variable-length records. Each entry of variable length includes the header and the content.
- *dbf* is the file, where attributive information of geometric objects described in *SHP* - file is written. It represents a database in format dBase II.

It is possible to compare this software with existing software with open source code (GeoServer, Geozilla World, World Wind Server, MapGuide Open Source, and others.) which are similar to the developed modules for mapping server, but have less features and potential.

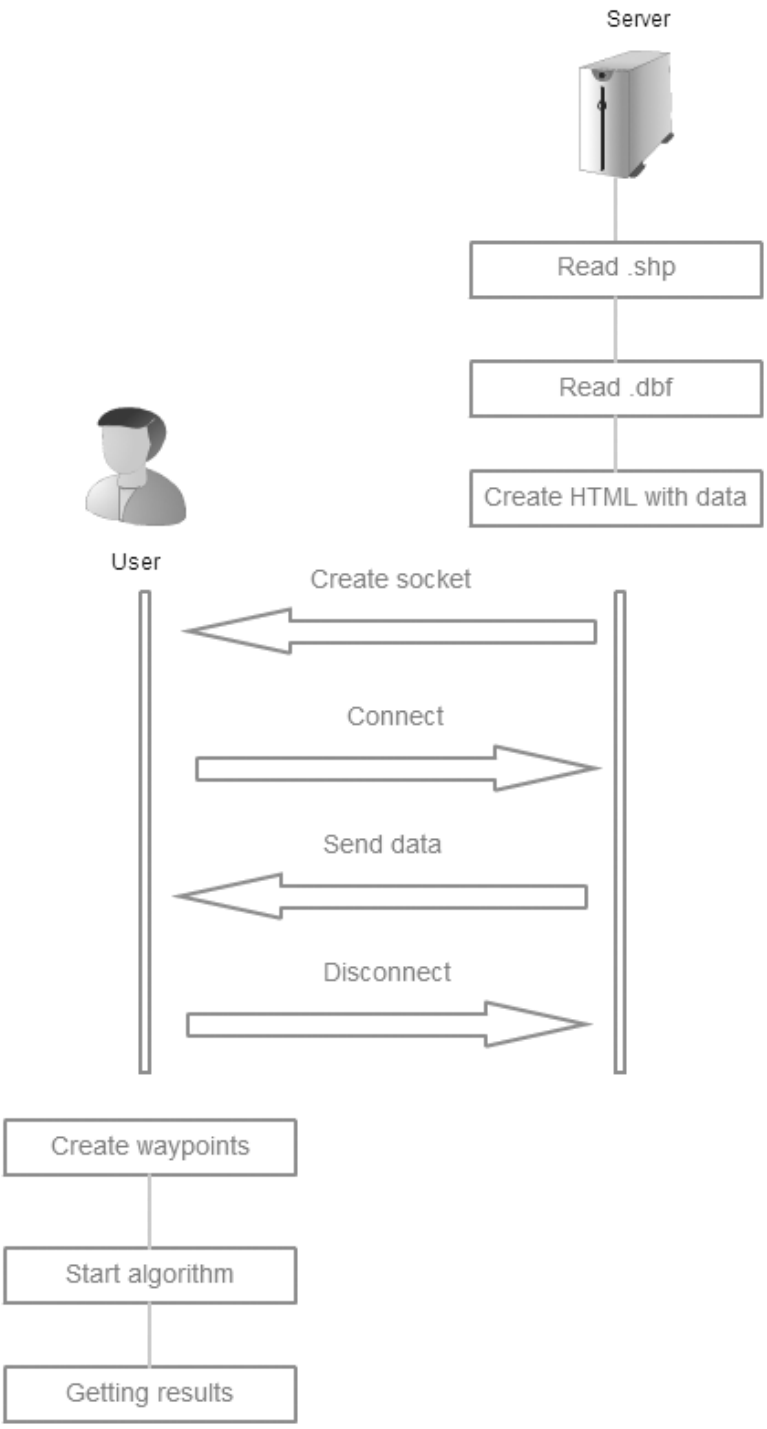

Figure 1. Sequence Diagrams

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R. Ivanyuk, Master student
A. Morozov, PhD in Engr., Ass. Prof., research advisor
V. Shadura, Senior lecturer, language advisor
Zhytomyt State Technological University

3D GRAPHICS IN A BROWSER (THREE.JS)

When we have a look at the past it will be possible to see many plugins which run on “Flash”. Flash is the multimedia Adobe System platform used for web application design or multimedia presentations. But “Flash” has several disadvantages such as:

- the excessive CPU overloading caused by the inefficiency virtual machine;
- the lack error control, leading to frequent failures of both the applications, and in some cases the entire browser, and the ability to flash-application to disrupt the entire browser.

The evolution of technology and constant improvement of gadgets have caused the necessity to enlarge the spectrum of device opportunities for a modern person. r We want something new, something that will make our lives more comfortable, and enable us to follow all the events, to work efficiently, to communicate, to have fun. Many people satisfy these requests using the Internet. In this case we can see that mobile devices do not work in flash and it is a fact. So, the necessity to design the advanced mobile flash-players is becoming more and more urgent.

Flash is improving. Recently the comparison of Stage3D (a set of 3D API, which brought on 3D flash platform) with WebGL (Web-based Graphics Library - a software library for programming language JavaScript, which allows you to create JavaScript interactive 3D-graphics, that operates in a wide range of compatible web browsers it) using the library «three.js» has appeared. This comparison is unexpected because “Flash” has got the prior positions. So, having 30 times excessive number of objects Flash demonstrates a higher FPS (Frames per Second - the number of frames per second). But the conditions were far from being equal.

The advantage of WebGL is obvious. It is, first of all, 3D responsive design for mobile devices in some browsers, such as Android Firefox version 4. Today, and in general, we can confidently say that not only the HTML5 has become the standard, but the technologies such as WebGL, reached the sufficient maturity. But we can not help noticing the fact that most applications (games, applications) are developed in flash. So, it goes about the social media (for example: "VKontakte" - game "Vormyks." But it is not the only one example). As a result, cell phone games are designed separately and one has to download them separately. And it is not easy for the people who are away from their personal computer or game console. It is not only about the games. The internet is becoming faster and people are having more

demands. Usually, people are not surprised with the shadow on text and shaded blocks of frames, but this technology is able to design video games, medical and scientific visualization and so on.

The advantages of WebGL application for more sophisticated users are:

- the cross-browser and cross-platform compatibility. Windows, MacOS, Linux matter nothing, as long as your browser supports WebGL.

- the use language JavaScript, which is quite common.

- the automatic memory management. In contrast to OpenGL in WebGL it is not necessary to perform the specific actions for the memory isolation and deleting .

- WebGL graphics possesses high performance that can be compared to the performance of native applications.

IT - specialists need new technologies and libraries which use the languages easy to use. That is why such libraries as js. and Babylon js use WebGL.

One of the most popular libraries is «three.js». Three.js - a small size cross - browser library JavaScript, which is used to create and display animated 3D computer graphics for web application development. Three.js scripts can be used in conjunction with elements of HTML5, CANVAS, SVG and WebGL.

A striking example of WebGL is a demo site «Assassin's Creed Pirates» and the site «Dino Hunt TV», and the libraries such as «Three.js» which are easy to create solutions based on WebGL.

WebGL mastering gives a lot of possibilities for IT-industry to create cross-browser and cross-platform masterpieces.

Preparation Phase

1. [Setup flattened list] For each scene graph object:
1. Init matrices.
2. Create geometry groups corresponding to face materials.
3. [Setup buffers] For each geometry group object:
1. Create WebGL buffers.
2. Create Non-WebGL buffers.
3. Add an item to flattened list.
2. Update buffers (Vertex buffer, Index buffer...).

Rendering Phase

1. Update matrices on all of the descendants of scene.
2. Set up camera matrices.
3. [Setup-loop] For each flattened list item:
1. Set up matrix.
2. Pick materials.
4. [Draw-loop] For each flattened list item:
1. Set up shader programs(and textures).
2. Prepare buffers.
3. Draw primitives

UDC 004.451.83

O. Khomenko, Master student
A. Morozov, PhD in Engr., As Prof.
V. Shadura, Senior teacher, language advisor

VEHICLE TRACKING SYSTEM USING GPS NAVIGATION

Modern people cannot imagine their lives without phones, smartphones or tablets. In fact, people need to spend less time for waiting. Therefore, a wide variety of applications are being invented that help us in everyday life. Communication, data exchange, data collection and information retrieval can be possible with the Internet and mobile applications.

One of such developments is the system of GPS (Global Positioning System) - a collection of electronic items for determining the position, the velocity of the object on the surface or in the atmosphere. The provisions of the object is calculated by the use of GPS- receiver that receives and processes the satellite signals space segment of GPS, and determines the exact coordinates of such system in ground control centers.

Sensor GPS in mobile devices can be used not only for its intended purpose (for navigation or determining the coordinates), but also for a variety of other, often non-obvious, at first glance, tasks. For example, the utility “Here I am 2” is used to determine the coordinates of the user, display it on the map, and send the link to Google Maps via SMS, email or other services to close friends or relatives. The "Parent Control" can time determine the position of the child (relative, friend) at any time, or receive the notification when the child has left the specified location (such as school).

A significant advantage of GPS is that GPS is available in locations where there is no mobile network.

To develop mobile applications that can use GPS is much recommended to use PhoneGap. PhoneGap (a platform used to develop the applications with support for HTML5 (Hypertext Markup Language), which allows you to create native applications with applying web technologies, and provides the access to powerful API.

The benefits PhoneGap are:

1. When we create a mobile application we can use the code that has been used on the main site;
2. The application will run on any mobile device that has a browser;
3. In HTML, CSS and JavaScript is easier to write and debug application than in Java (or Objective-C for iOS);
4. It is much easier to find a web developer, than Java- programmer or Objective-C- developerer;
5. With using JavaScript we can get access to the API device having the opportunity to control the camera, contacts, files and other hardware advantages.

Another advantage of this approach is that PhoneGap is not platform-specific. This means that if you have a single codebase (even on plain HTML) - PhoneGap easily encloses it in any mobile platform: for example, Apple IOS, Google Android, Windows Phone 7, etc. So you get the best opportunities, as well you save the time spent on cross-platform development. Besides, there in no need to learn a few of languages.

What is a web application? A web application - a client-server application where the client is the browser and a web server is the. The logic of a web application is distributed between the server and client, data storage is performed mostly on the server, exchange of information takes place over the network. One advantage of this approach is the fact that customers do not depend on the particular user's operating system, so the web application is cross-platform services. The web-based applications which are loaded into the mobile Web-browser are different from the buit0in ones. Their code is developed using Web-based technologies (HTML, JavaScript and CSS), which are not dependent on the operating system of the device. HTML and JavaScript are well known to Web-developers for Web-pages desktop browsers creating. Most of the mobile Web-browsers can render the same Web-pages, but Web-sites often provide mobile version with a smaller amount of information and faster loading (due to smaller screen sizes and slower network).

To run Web-based applications a user enters the URL-address in the mobile Web-browser. Since the loading is finished, the Web-page becomes an access point in Web-based application. Web-based applications do not propagate via storage applications; they are links which can turn to other Web-pages, emails or even write on paper.

I have developed the mobile application and website that allows you to track the vehicles using GPS-navigation.

The following technologies and development environments are used:

1. Operating system Windows, OS X or Linux.
2. Java Development Kit (JDK) 5 or JDK 6 (JRE is not enough).
3. Integrated development environment Eclipse (Eclipse Helios V3.6 or higher) or IBM Rational Application Developer V8.
4. Android SDK and platform (12 or higher).
5. Plug Android Development Toolkit (ADT) for Eclipse.
6. PhoneGap SDK (V1.0.0 or later).
7. Google Maps API

Google Maps is the world's most popular online mapping service. Google Maps API is used by more than 800 thousands of sites and the number of users of the mobile version is more than 250 million.

API Google Maps allows you to add easy-to-use interactive maps on the public website. This feature improves the working environment of users, making it easier for to find information about the organization. For this reason Maps API Google acquired the high popularity throughout the world. If Google maps play an important

role on a public web site or are used in domestic applications for employees, organization needs enterprise-class application that handles a large number of visits and provides needed support.

The principle of my development is as following. A driver of a vehicle loads the application that will transfer to php-server data about the current location by using GPS-navigation. The user clicks on when a website gets the opportunity to choose the desired route number, the track number of vehicles, and their location in real time and sees this on the map of Google Maps. There is also a form of authorization that will log in by an administrator who provides the ability to add the numbers of routes, vehicles,the driver cell phone numbers and general information on the site.

So, the given application is developed using the latest technologies such as PhoneGap, HTML5, CSS3, JavaScript, PHP. It will contribute to saving precious time of users, and will track the vehicles in real time.

UDC 681.515

O. Khomyak, Master student
O. Bezvesilna, D.E., Prof., research advisor
M. Bogdanovskiy, Senior lecturer, research advisor
N. Krushynska, lecturer, language advisor
Zhytomyr State Technological University

COURSE CONTROLLER DRONES USING THE FUZZY LOGIC

Navigation and Control of Small Unmanned Aerial Vehicles (UAV) provides solving some problems which assure basic functions, such as control and stabilization of the course, position and orientation along the flight path. In order to realize the basic functions of navigation and flight control UAVs should have: the location of the object relative to the starting point, orientation with regard sides of the world, speed, direction of movement and speed of rotation in three dimensions. While determining the course, the target need is to solve such problems as justification for the choice of the mathematical description of disturbing factors, selecting optimal locations of sensors on board the UAV, development of algorithm processing data from sensors. Stabilization of the aircraft in space should provide quenching of elastic waves of the apparatus body during the flight and maneuver.

The current level of aviation technology development is characterized by a significant increase in the requirements placed on the accuracy and reliability of solving problems in navigation and control of the UAV. Automatic flight control system should receive information about the spatial location of the UAV with sufficient accuracy to stabilize the apparatus during the flight and moving at a given point in space. The main sources of information are on-board navigation equipment, including radio systems. Navigation accuracy is increased significantly while

implementing global satellite navigation system (SNS) such as GPS. The combination of CHC and radio equipment landing, allows increasing the accuracy of the location of the UAV.

Inertial navigation system has stable flight parameters, but with increasing observation time it was detected the accumulation of errors in determining the coordinates. With the integrated use of the characteristics these systems, radio and inertial navigation system, you can organize obtaining information about UAV deviation from the specified glide path planning with improved performance accuracy. The combination of radio-electronic systems in drones landing mode, inertial and satellite navigation systems can solve the problem of increasing the accuracy control on landing stage and will meet the requirements that are made to determine the parameters of the navigation of unmanned aircraft.

To realize the above piloting tasks it was proposed the structure of control system, shown in Figure 1

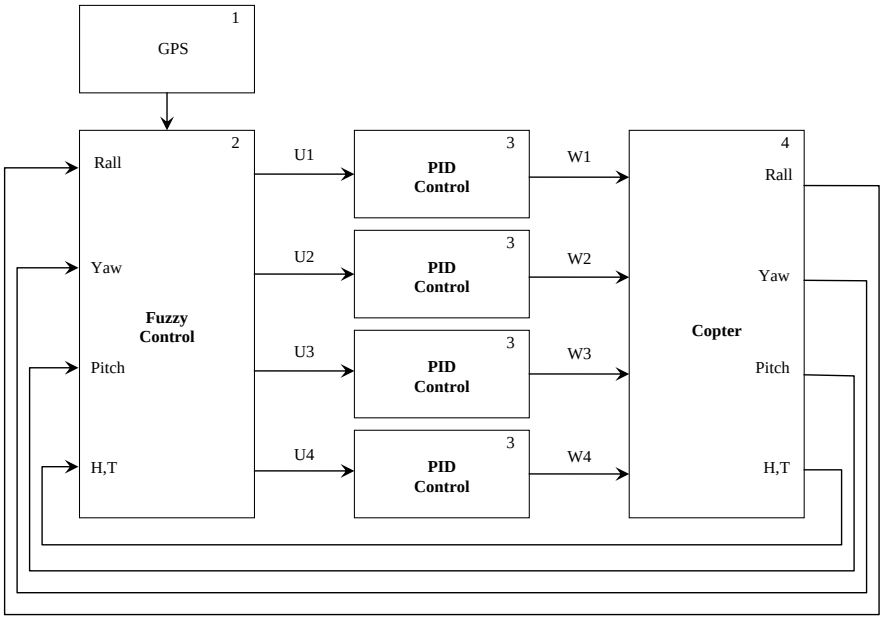

Fig.1. Block diagram of the control UAV

Appointment blocks shown in Figure 1 as follows

Box 1: Dial GPS,creates GPS-coordinate , by which should move the UAV. Coordinates are translated into three-dimensional Cartesian system of UAV and serve for the laying of course along the surface of the landscape.

Box 2: Fuzzy controller, based on the coordinates of the current position of the apparatus generates control signals U for 4 UAV engines. Input is position of the apparatus in the form of Euler angles (Roll, Yaw, Pitch), the current height H of the UAV from sensors and vector direction T along the course.

Block 3: UAV Engines with local regulators. To the input of each motor supplied control signal in the form of voltage U (U1, U2, U3, U4 in the diagram),

proportional to the rotational speed W (W1, W2, W3, W4 in the diagram) of each propeller separately for a given flight mode. Stabilization of rotation speed propellers provides directional thrust UAV implemented using PID controller for each motor in separately.

Box 4: UAV as object of control creates the basic flight characteristics of UAV based on current speed of rotation of each propeller, thus realizing the simulation model. Information about the position and orientation are displayed as Euler angles and change of direction vector and altitude UAV. Obtained from the model values are transferred to the fuzzy controller which implements stabilization by the course and implementation of a given flight characteristics.

The structure of the control system has several advantages. Control scheme implements independent control of each motor in separately, fuzzy controller increases the robustness of the flight course control and stabilization regardless of the initial and current state of the system. Orientation in space is determined by using a simulation model of the UAV. Using fuzzy controller makes it possible to avoid the problem of accumulation of errors and compensate for the effect of external disturbances, so how is dynamically calculates the values at each iteration and fuzzy controller generates the actual control signals for UAV engines.

Setup and reprogramming UAV for realization other flight characteristics is performed flexibly by expanding the base of fuzzy rules without hardware restructuring system. Benefits outlined above show the prospects for further study of the proposed control principle while forming new UAV flight characteristics and methods of stabilization with arbitrary number of screws.

UDC 004.451

O. Kotvytsky, student
A. Morozov, PhD in Engr., Ass. Prof., research advisor
S. Kobzar, Senior lecturer, language advisor
Zhytomyr State Technological University

RIGHT CHOICE

In this paper we are going to review the main problem of people who are going to enter the University. The process of applying for the University is really important and, unfortunately, unpleasant. It is generally agreed today that the amount of people who want to get higher education are increasing year by year. Therefore we want to underline the urgency of this problem.

Few years ago there were created a few websites in order to solve the issue. Let us consider what the advantages and disadvantages of these solutions are. All of them have a database with the information about the entrance scores for almost all the universities in the country. But their main drawback is an absolutely inconvenient usability. It may take a long time to find the universities you need and then to

compare their scores with each other. However, even if you are able to do this, you still don't know for sure about your chance to become a student of a chosen university.

For these reasons the project called 'Vuniver' was developed by the students of the first year of study of Zhythomyr State Technological University. It's also a website, like previous projects, but the main difference between our application and already existing ones is the fact that we can calculate for users their chance to be enrolled in the university. Project was being developed during last two months. And now we can claim that we have created more useful thing then matriculants had before. To confirm this point of view, let us consider several factors. First of all, we knew that the site must be visually appealing and has well- constructed usability. So using HTML5/CSS3 we have created existing design.The server part of the project consists of C++ and CGI application and it's placed on Ubuntu server. Secondly, as were said before, our product is able to calculate the chance to enter the university. For this aim the method of beta random distribution was used. And finally, using MySQL the database was created that consists of information that was collected from all those applications we spoke about before.

So the arguments we have presented prove that 'Vuniver' is the most convenient solution for the problem of incoming students. Besides, the project will be improved in future. And in conclusion, it would be unfair not to mention one more time that the problem is really important and needed to be solved as fast as it is possible.

UDC 004.738.5

A. Muzychuk, student
S. Kobzar, Senior lecturer, research/language advisor
Zhytomyr State Technological University

SOCIAL NETWORKS AND THEIR IMPACT ON THE DEVELOPMENT OF CIVIL SOCIETY

Information technologies contribute to the growth of our social activities in the society. This activity is reflected in the realization of opportunities for self-expression, social sharing experience, activities aimed at improving personal and social development. The main causes of the current appeal of social networks are as follows:

- providing information, support from other members of the social network;
- verification of ideas;
- social benefits of communication;
- recreation.

At this stage of the development of social networks, they can be described as technological systems of organization and management of electronic information, designed to provide communication between the subscribers interested in it, united by common interests, information needs and communication skills.

Social networks of the Internet are becoming an important tool of civil society activities, the media with a high degree of independence.

The leaders of social opinion use social networks for:

- improving the effectiveness of local self-government;
- informing the public on topical issues;
- establishing feedback of management to the requests of citizens;
- creation of conditions for transparent economic and political processes;
- presenting of social groups and strata of the population before the authorities and local self-governments.

Thus, social networks in developed democracies become an important part in shaping of the society.

With the development of Ukrainian information society and increasing level of using of information technologies, the members of our society can predict the growth of social significance of participating in exchange networks.

Convergence of network technologies, mobile communications, mobile computing systems of geo-positioning promote the involvement of millions of people in the network space, creating the conditions for using them to solve scientific and socially important problems. Thus, a new level of socio-cultural reality, a comprehensive analysis of both technological and cultural foundations have appeared. Researchers point out that social networks today have created the conditions for a new global trend of relations with partners, colleagues and users.

Using social networks to accumulate and transfer knowledge becomes economically viable. Social networks are implemented in critical areas of knowledge processing - idea generation, processing large amounts of information, innovation management. Since intellectual content contained in social science networks is a new type of information resources and is a part of the national intellectual capital, it is important to study it, to look for optimal ways to preserve and use state resource management strategies.

It is absolutely necessary to use network technologies in science and education, to have free access to information, to update the issue of intellectual property rights. Finding ways of solving this problem depends on the balance of interests of authors and publishers, on the improving the legal framework and removing legal barriers to the functioning of library facilities to ensure the human right to free access to information.

Developing a network using specific manipulation technologies can be used in all areas of public life. For example, we can consider the possibility of using them in trade. With the help of the social networks it is possible to use new marketing strategies and ideas.

The possibilities of social networking technologies are making adjustments in ideas about information security. Personal data of users are in the public domain and may be used without any permission with promotional purposes. Serious trouble for the user can be associated with the cracking of the account and using all the information to the detriment of the owner, including the purpose of political or economic espionage and discredit.

Experts point out that social networks are actively expanding, becoming a channel for the subjects who can influence the information they need. They have the ability to reach massive audiences, to reduce the ability of receptors to block information, to organize resistance in the information sector.

It should also be noted that modern cyber activity is also very serious business: it attracts external staff (outsourcers) - talented software engineers create software products and offer paid services for profit. Along with online payments and online banking, social networks are among the most vulnerable to the attacks of criminals.

According to experts and official recognition of the events, Twitter and Facebook played a major role in social disturbances named "Revolutions" in most of the Arab world, but in a different way - technology-driven, since the authors of this project hope for real "revolutions" but actually they get uncontrolled chaos.

Practice shows that an effective method of solving problems of national information security and the development of information in Ukraine is to provide comprehensive, systematic development of the national information system that should meet the requirements and interests of the Ukrainian society. The introduction of modern technologies in specific sectors leads to uneven development of the society and thus creates a number of serious problems.

In an increasingly global activation processes in the modern world, along with the positive aspects of their impacts on the global community there is also the possibility for total unification, other previously unknown problems for the development of sovereign states and nations. Nationwide information system can guarantee the neutralization of threats to modern information and use the positive factors of information. The efficient operation of the system at the national level can provide a constructive exchange of information of and about Ukraine in the international arena, and the development of national information base in the mobilization of domestic resources, which is an important prerequisite for social progress.

Under the conditions of rapid strengthening of global information impacts, the development of the nation and the state is only possible with the adequate development of the national information system. With the development of information technology in all aspects of life, the value of state structures should increase in managing the national information security, preservation and development of information resources of national organizations in opposition to information wars and computer crimes.

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UDC 001

V. Mykolaychuk, student
O.Shapovalova, lecturer, research advisor
S. Kobzar, Senior lecturer, language advisor
Zhytomyr State Technological University

COMPARISON OF WINDOWS 8.1 UPDATE AND WINDOWS 10

Most of modern developments and researches of students and scientific staff of the technological universities are conducted with the help of computers. An operating system is software that manages computer hardware and software resources and provides common services for computer programs [1]. The commonest operating system used nowadays is Windows. There are two latest versions of Windows. They are Windows 8.1 Update and Windows 10 Technical Preview. To find out which OS is the most optimal for professional and everyday usage we will compare the features of both of them. We can find a lot of comparisons of Windows 7 and Windows 8 but there is quite a little comparisons of Windows 8.1 Update and Windows 10 Technical Preview. Let's consider some information about these operating systems in different categories. Both operating systems were tested on the same computer. The computer has Intel(R) Core(TM) i3-3120M CPU @ 2.50GHz, 4GB, 2 cores, 4 logical processes, RAM, NVidia 710M 1Gb RAM, Intel(R) HD Graphics 4000.

Performance results

We used PCMark 7 to test both operating systems. PCMark 7 is a complete PC benchmarking solution for Windows 7 and Windows 8. It includes 7 tests combining more than 25 individual workloads covering storage, computation, image and video manipulation, web browsing and gaming. Specifically designed for the full range of PC hardware from netbooks and tablets to notebooks and desktops, PCMark 7 offers complete Windows PC performance testing for home and business use [2].

- Windows 8.1 Update scored 5736 points.
- Windows 10 Technical Preview scored 5914.

There is no critical difference between these results but we can say that Windows 10 Technical Preview could run some tasks faster than Windows 8.1 Update.

3D graphics performance

To compare these characteristic we used 3DMark 11 with Performance option (1280x720, 720p) with a moderate load suitable for most gaming PCs. 3DMark 11 is a DirectX 11 video card benchmark test for measuring your PC's gaming performance. 3DMark 11 makes extensive use of DirectX 11 features including tessellation, compute shaders and multi-threading. Trusted by gamers worldwide to give accurate and unbiased results, 3DMark 11 consistently and reliably tests your PC's DirectX 11 performance under game-like loads [3].

The following results were obtained:

- Windows 8.1 Update scored 479 points.
- Windows 10 Technical Preview scored 482 points.

The results of these tests are almost identical. It is obvious that Windows 10 will perform 3D graphic better then Windows 8.1 Update and will have better FPS result in 3D graphic performance.

Boot time

These test was performed on these operating systems before the installation of different kinds of software that could slow starting the operating system.

- Windows 8.1 Update took 18 seconds to start.
- Windows 10 Technical Preview started after 31 seconds.

As we can see Windows 8.1 Update started much faster than Windows 10 Technical Preview.

User interface

Microsoft CEO Satya Nadella admits that his company has made mistakes in the user experience of Windows 8. But, according to Nadella, the company is making progress. Microsoft frankly admits that Windows 8 didn’t have an optimal user experience, something consumer and enterprise users already found out [3]. So we can surely say, that Windows 10 is more user-friendly OS. There we can find out *start menu* like we saw in Windows 7 and *desktop mode* of Modern-UI apps.

Security

Windows 8.1 Update and Windows 10 Technical Preview have built-in antivirus — Windows Defender and they get similar updates. But how it is good you can see from the reviews of different antiviruses. From the test of antiviruses by Comss.ru [3] we see that Windows Defender took only 24-th place. In this list of antiviruses there are at least 23 that are worth being chosen to protect your computer.

Taking into consideration all above mentioned we can state that it's better to choose Windows 10. It has better performance results, it's more comfortable for users and developers, it works faster than Windows 8.1 Update. Creators are going to add new features to Windows 10 and it will be more stable in a final build. As a result we

can absolutely say that Windows 10 Technical Preview is better than Windows 8.1 and Windows 10 will be a good choice for home using or developing.

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UDC 519.684.6

O. Nikolaychuk, Master student
A. Morozov, PhD in Engr., Ass. Prof., research advisor
V. Shadura, Senior lecturer, language advisor
Zhytomyr State Technological University

HIGHER EDUCATION INSTITUTION SCHEDULE AUTOMATED SYSTEM DEVELOPMENT

The beginning of every Academic year brings a lot of troubles to a University employees concerning schedule design. The problem is too complex due to the fact that there are some people involved in this process and it is hard to synchronize the work. Also too many details have to be taken into account such as: the number of student in a group, the type of class-room, the same subjects for some groups and the possibilities to find the best solutions to make the studying process more effective and so on. So, there appeared the need to develop the appropriate algorithm to solve this problem.

The following web technologies are applied to make the simultaneous use of several schedule users more comfortable: PHP, MySQL and javascript to achieve the

dynamic content changes. All the mentioned above technologies help to develop the application which can be available either for a personal computer or a mobile device.

The application will have several modes:

Schedule designer. The users can form the schedule by themselves and the application will check it for the possible changes accuracy by means of the specific algorithm. The latest technology Drag and drop on the basis of javascript is used here to make the use comfortable. This technology allows dragging the pieces of information that brings a designer effect. JQuery is used here to check the accuracy of data in schedule and this provides the direct accesses to server without page loading. It will also help to make the work faster and to save the obtained data.

Automation. The system generates schedule automatically taking into account the forseen probabilities of any event and checking algorithm for the accuracy of data obtained.

User tips. The students and the teachers will be able to visit the site any time and to check the schedule. The search of different types of information will be implemented such as the schedule for some definite group, the availability of class-room, etc. The results can be saved or typed.

The given application will reduce the time of schedule design and will bring the accuracy to its data.

UDC 528.27

A. Prosyuk, Master student
O. Bezvesilna, D.E., Prof., research advisor
N. Krushynska, lecturer, language advisor
Zhytomyr State Technological University

TWO CHANNEL MEMS-GRAVIMETER

Development of science and technology is never standing on the same place. Nowadays microelectromechanical systems and technologies (MEMS), that include microelectronic and micromechanical components, are one of the most perspective. MEMS-devices are produced on silicon lining with micro processing help, similar to technologies of single-chip electronic circuit production. One channel MEMS-gravimeter consists of two plates with dielectric between them and inertial mass. At the time of affecting acceleration along vertical axis inertial power is appeared, that affects on mass. The plates are contracted under this power affecting. Proportional electric charge is appeared; it is removed through a conductor. Size of charges will be proportional to size of acceleration that is registered further.

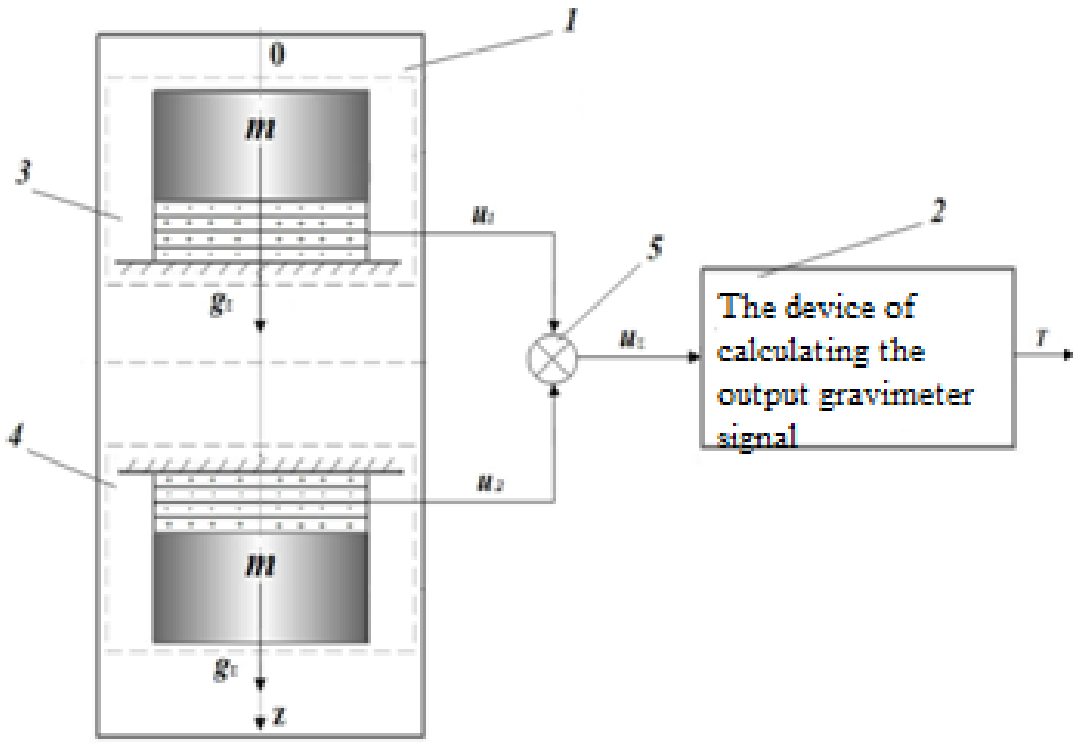
The one channel MEMS-gravimeter construction doesn’t provide the compensation of instrumental mistakes under temperature changing influence, humidity and pressure of environment, which are important in extreme conditions.

So the main disadvantage of one channel MEMS-gravimeter is low accuracy of the measurements of gravitational acceleration.

The main idea of the two channel MEMS-gravimeter is improving the one channel MEMS-gravimeter. The two channel MEMS-gravimeter has a sensitive element with two channels. They are situated one above the other and are made in one carcass. The first channel consists of two plates with dielectric between them and inertial mass that is situated above those plates. The construction of the second channel is almost the same but the inertial mass is situated below those plates.

The improving of accuracy of the measurements is provided by creating the second channel. The sensitive element is made with two channels. The element of the first channel, inertial mass in above plates, works on contraction. Identical element of the second channel, inertial mass is below plates, works on straining. Output electrical signals of the both channels are summarized in the adder. The resulting helpful electrical signal will be proportional to the double signal of gravitation acceleration.

Due to using the second channel there are no signals of mistakes under temperature changing influence, humidity and pressure of environment.



Picture 1.The block diagram of the two channel MEMS-gravimeter: 1- carcass of gravimeter, 2-device of calculating the output signal, 3-element of the first channel (mass is below), 4-element of the second channel (mass is above), 5-adder

UDC 621.865.8

N. Samsonova, Master student,
V. Kyrylovych, PhD in Engr., Ass. Prof., research advisor
M. Bogdanovskiy, Senior lecturer, research advisor
N. Krushynska, lecturer, language advisor
Zhytomyr State Technological University

STRATEGY PLANNING MOTIONS OF THE WORKING BODY OF INDUSTRIAL ROBOTS USING FUZZY LOGIC

One of the most common methods of coloring used in automobile manufacturing with painting the car body elements is electrostatic spraying method. With the technology of lacquer and paint coatings by spraying a constant electrostatic field modern coverage for hardware is created, featuring high strength, aesthetics and economic benefits. This type of painting achieves a better appearance of painted surfaces that increased resistance to aggressive influence of environment. The advantages of powder coating also include:

1. It is possible to achieve a greater thickness of the coating in a single pass, does not require the use of different solvents staining, high corrosion resistance coating;
2. The powder material contains no solvents, no pollution environment by waste during painting; it can ensure better working conditions and health;
3. The use of new technologies such as powder coating, contributes to the high efficiency, suitable for automated production where appropriate and possible reuse of powder;
4. The possible use of thermoplastic powder materials.

There are several factors that limit the application of this method and require considerations when planning operations of electrostatic painting: varnishing and painting properties of the material determined by its physical and mechanical properties (liquid or powder with different chemical composition) which determine the rate of paint, ink spot size, the size of the surface of the painted surface, the area of overlapping layers of paint, etc. surface condition (smoothness and waviness) and form a product that is painted. The second group of factors is technological coating technology, the method of equipment application, preparation of working premises so that due to irrational, inefficient use it leads to uneven coating, poor paint adhesion to the surface, and irregularities on the surface. Another critical element in the organization including powder coating is set for dusting powder as it determines the quality of surface transmitting efficiency, productivity, uninterrupted operation (e.g. breakdown), etc.

In terms of this research it is "typical" to call these surfaces like: horizontal, vertical, flat, curved surfaces, internal and external corners. For different model surfaces we need to use different painting techniques. The shape and surface

condition of the product influences on the choice of the trajectory of the working body (WB) of industrial robot (IR) staining.

According to the basic techniques of coating, the trajectory of sprayer staining should pass across the length of the product that is painted, most parallel passages and perpendicular (at right angles) to the surface. Sprayer should always be oriented at right angles to the surface. Spraying should be done by straight uniform motion, moving across the painting in such a way that the torch is cut applied to the previous one, with 50 percent overlap. Failure to comply with these rules will result in uneven coating thickness and its poor visual display. If the sprayer is too close to the surface that is painted, the paint will be more nebulize, and then it will need to move quickly to prevent clipping paint warps layers. Similarly, if the sprayer is kept too far it can cause excessive dust of painted surfaces.

Strategy planning movement of WB IR provides a rational sequence selecting working areas for selected IR of a specific car body. The working area of each IR divided by the typical surface above, for each of which there is a selected coating technology that provides a number of settings work and trajectory painting.

Body surface is divided into separate areas (work areas robot). Each robot carries dying process within their work area.

The working area of each IR is complex and requires more detailed consideration. Depending on the type of surface using typical coloring scheme is used and it requires compliance with certain technical requirements, the speed of the working body, paint and other feed.

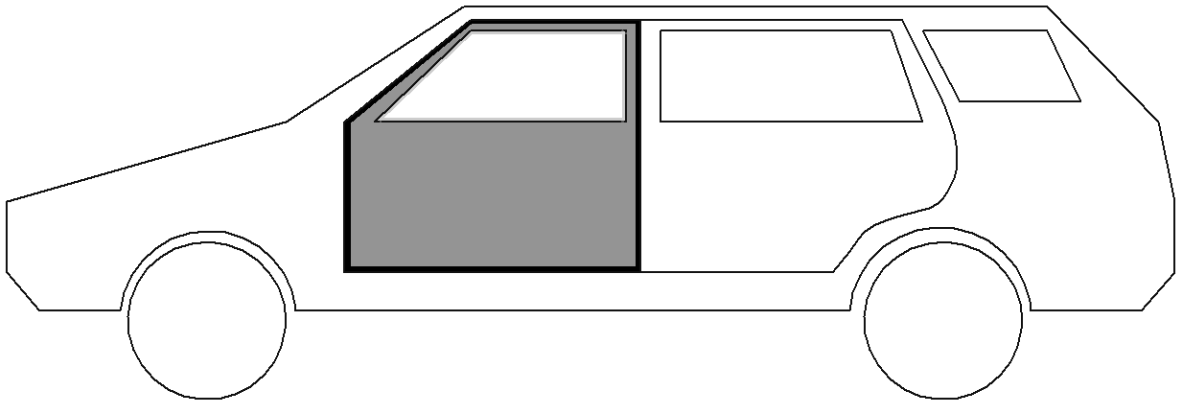


Fig. 1 Conditional division of workspace 3 IR Tell surface

Fig. 1 Item selected for the analysis of the "door" of a particular work area. It is generally divided into 3 types of surfaces:

• №1 - flat surface;
• №2 - outer corner;
• №3 - inside corner;

Further surface treatment will be in accordance with the rules of regulation established by fuzzy switching between bands IR service.

Scheme implementation of fuzzy controller is implemented by using software environment MATLAB/Fuzzy Logic Toolbox. According to the data of the object under study there are the stages of control disturbances formation:
1. Getting input signals, which are:
h1- zone coloring tied to the IR;
x2 - type of surface to be stained;
x3 - WB IR position in Cartesian coordinate system associated with IR: kh_{ro}, u_{ro}, z_{ro}.
2. "Fuzzyfication" data input signals (converting the values to fuzzy type, in the form of linguistic variables);
3. Determination of fuzzy values of the output variables:
u1 - cone course WB h;
u2 - pressure spray gun receiver;
u3 - linear velocity of the spray gun along the equidistant surface of painting;
u4 - component of motion along the x coordinates in the coordinate system of IR;
u5 - component of motion along the coordinates in the coordinate system of IR;
u6 - angle spray gun perpendicular to the main surface of the painting.
4. Fazzyfication input signals;
5. Formation of productive rules.
6. Realization output mechanism and Defuzzification.
Is a result of this work it was analyzed the main stages of the process of electrostatic powder coating and factors affecting the quality of the coating and it was offered the methodology based on the method of determining working areas of IR in a real time using fuzzy logic.

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D. Statkevich, Master student
I. Cherepanska, PhD in Engr., Ass. Prof., research advisor
L. Mohelnytska, PhD in Phil., Ass. Prof., language advisor
Zhytomyr State University of Technology

AUTOMATED CONTROL OF STANDARD TIME FOR THE PROCESSING OF THE PRODUCTION OBJECTS IN DRILLING PROCESS

Modern production, organized as a flexible manufacturing system (FMS) provides for the use of automated manufacturing equipment, including machine tools with numerical control (CNC). An important problem that arises in the implementation processes on machine tools with CNC is automated control of standard time, spent for processing of production objects (PO) on drilling machine. The indicated conditioning the fact that the standard time is the basis for remuneration, calculating the cost of finished products, the duration of the production cycle, the required number of machines, tools and workers, as well as production planning in general.

Time standardization is setting technically feasible consumption rates of production resources. As so it is accented so-called technical standard time (TST), which is the amount of work that needs to be spent on processing of the single PO or executing a unit of work on certain manufacturing operations (MO) with the most efficient use of all means of production. Irrational use of TST leads to a significant increase in unit cost, which in turn can cause significant economic losses for the company.

Standard time, and its calculation specifics depends on the organization of production, but in general, the rate of time can be represented by the expression: $TST = tpe + top + tm + tre + tpt$ where TST - standard time per unit; *tpe* - preparatory and final time; *top* - operative time; tm - time for maintenance work; *tre* - time to rest and personal needs; *tpt* - breaks caused by technology and manufacturing process.

The components of the operational time are the main tm and auxiliary ted technological time. Moreover cost analysis for components of operational time top showed that control of standard time TST when performing drilling process can be made affected by the length of the main technological time tm.

Analysis of factors affecting the length of main technological time tm formally describe connection of TST for processing of PO to its physical, mechanical, structural and technological features, and characteristics of the process as follows: $tm \rightarrow \{PO; TO; F\}$, where tm - main technological time that is defined in the operational process of the machine; PO - parameters describing PO, which are processed on drilling machine, for example, material of PO, PO design features (grooves, coots, trims, etc.) diameter pretreated bores in deep bore drilling; TO - technological parameters of technological operation for drilling process, for example, the length of the working stroke, the number of cutting tool movements, its diameter, material, blunting, design features of the drilling machine; F - set of disturbances, such as deficiency of PO (material or discrepancy of surface layers for PO), the deficiency of tools (inadequate quality of material or coating of cutting tool), blunting of the cutting tools. Defining the set of typical disturbances allows synthesizing a set of solutions (G), which should inform the operator to minimize the length of the main technological time. These solutions include: replacement of cutting tools, quality control of PO, cutting tool sharpening and enabling cooling.

Said above allows to synthesize structural model of standard time control system (STCS) shown in Figure 1. The input STCS gets operational data describing the characteristics of PO TO, which arrive into the data base, in which current data from various sensors is gathering and stored previous fata with the time to which they belong, after which all data is brought to a common format and consistent. The most important component of system is data mining. performed in three steps: 1) search for patterns in connection of the length of the main technological time *tm* with characteristics of PO and TO; 2) usage of indicated patterns in predictive modeling for the length of main technological time *tm*; 3) analysis of exceptions to detect and

identify anomalies in predicted length main technological time *tm* that can detect and identify deviations from the TO of drilling, which should be reported to the operator.

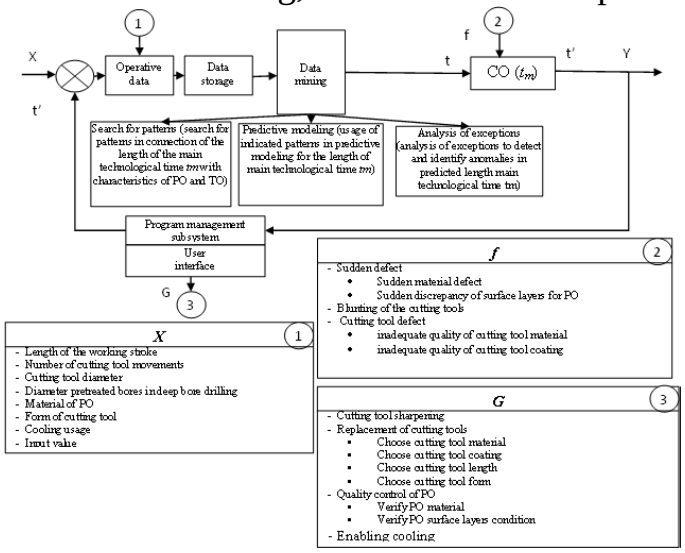

Fig.1. Structural model of STCS for drilling TO

The resulting predictive value for length of main technological time *tm* l and messages of need to intervene in TO of drilling by operator, is notified via user interface controlled by program management subsystem. In program management subsystem stored data base for decisions, which must be informed to the operator when presence of abnormalities is detected and made decisions about the need for issuing messages to the user interface. Thus the proposed STCS is enhancing the quality of decision-making by operator in time normalization for drilling process.

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Yu. Tkachenko, Master student
V. Kryzhanivsky, PhD, Ass. Prof., research advisor
V. Shadura, Senior lecturer, language advisor
Zhytomyr State Technological University

SOFTWARE APPLICATION FOR THE OPTIMUM INTEGRATED HEAT EMITTING CIRCUITS

There are technical systems which contain heat sources. The examples of these systems are the systems on a chip, radiant furnaces etc. These systems work, mostly, depending on the accommodation of the heat sources they contain. As it has been described in scientific papers, the modern technologies of electronic devices operate using millions of transistors. These transistors work at GHz frequencies. One more factor to mention is the allocation of substantial amount of energy and as a result we have the temperature increase. These thermal effects make a bad influence on the functioning of the systems on a chip. For example, the high temperature causes

operation errors and even destroys the microchip. At the design stage of the systems on a chip the developers are trying to solve the problem of placing the elements while allocating heat in order to minimize the bad influence of temperature extremes. The design performed by means of CAD/CAE system is helpful for the mentioned improvements.

Let's consider another example. We have to process the part of machine in the radioactive oven. Firs, there is a need to get the uniform temperature distribution. There are the elements that allocate heat on the walls of the oven. Technically they are placed in a form of matrix. They cause temperature extremes, so, as a result we obtain the needed temperature field. In terms of optimization we have to place the source of the given intensity into one of these matrix cells. CAD/CAE systems help us to find the best solution of placing the sources of given energy.

The perspective method of solving problems of this class is the minimax method of mathematical programming. We have to research the dependence of the solution of boundary value problem on the parameters of sources pacing. Boundary value problems can mostly be solved by the numerical methods in particular by the finite element method. In this paper we consider minimax problem of optimum placement of sources, when the temperature distribution is described by mixed boundary value problem for elliptical level.

This is the mathematical formulation. Let $A(x,y)$ finite function in R^2, which is the carrier of the arbitrary φ-object. So this φ-object will be called the carriers D of physical field carrier and is denoted as $suppD$. The function $A(x,y)$ in this case in called the intensity of source D. Let us consider the area Ω in the two-dimensional Euclidean space, which contains the carriers of physical field sources $suppD_i$, $i=1,...,m,$. Each source carrier is assigned to its own local coordinate system $O_i x_i y_i$, $i=1,...,m,$ and each area Ω is assigned to the global coordinate system Oxy. The rotation of the local coordinate system in relation to the global coordinate system is impossible. As a result, the placement of each carrier in global coordinate system is defined by the placement of the starting point O_i of its own coordinate system. In global coordinate system we assign O_i as $z_i=(\xi_i,\eta_i)$, $i=1,...,m$. So, the placement of all the carriers in global coordinate system is assigned as $Z=(z_1,z_2,\ldots,z_m)$-vector.

The physical field that is induced by the sources and environment is described by the following problem for equations of elliptic type:

$$\frac{\partial}{\partial x}\left(k\frac{\partial u}{\partial x}\right)+\frac{\partial}{\partial y}\left(k\frac{\partial u}{\partial y}\right)=-f(x,y,Z) \quad (1)$$

.

$$u\big|_{\partial\Omega 1}=\varphi,\ k\frac{\partial u}{\partial n}\bigg|_{\partial\Omega 2}=-q \quad (2)$$

.

$$f(x,y,Z)=\begin{cases} A_i(x,y,z_i),\ if\ (x,y)\in suppD_i \\ 0,\quad if\ (x,y)\notin \bigcup_{i=1}^{m} suppD_i \end{cases} \quad (3)$$

.

where $\partial\Omega 1, \partial\Omega 2$ is the sector of boundary of the area Ω, n is the normal to $\partial\Omega 2$, φ, q the functions assigned on $\partial\Omega 1$ and $\partial\Omega 2$, k is the function assigned in Ω.

The function, which depends on the carriers of physical field source is:

$$F(Z) = \max_j u(x_j, y_j, Z), \quad j \in \{1,2,\ldots, p\}. \qquad (4)$$

where $P_j(x_j, y_j), j = 1,2,\ldots, p$ are the fixed points of area Ω.

The problem statement: we need to place the carriers, of physical field so that the assigned function of maximum could get its minimum value on the condition under the carriers of sources are not crossing and remain within the limits of the area.

$$supp\, D_i \cap supp\, D_j = \varnothing, i < j = 1,2,\ldots, m \text{ is the condition,} \qquad (5)$$

in which the carriers are not crossing,

$$\bigcup_{i=1}^{m} supp\, D_i \subset \Omega \text{ is the condition, in which the carriers} \qquad (6)$$

remain within the limits of the area.

The conditions (5) – (6) define the admissible plural G of Z values. Let us e rewrite the optimization problem:

$$F(Z) \to \min, Z \in G. \qquad (9)$$

This optimization problem is classified as a permanent minimax problem. To use the appropriate methods to find the stationary points of function $F(Z)$ on G it is recommended to calculate the partial derivatives of function $u(x, y, Z)$ according to the parameters of placement of the sources.

To solve this problem we have to select a lot of starting points and calculate them. Then we have to choose the best solution.

The algorithm development for solving one type of specific tasks for the discrete sources of physical field optimal placement is a scientific novelty of this research.

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O. Voloshyn, Bachelor student
T. Skrypnyk, Senior lecturer, research advisor
L. Petliovana, PhD in Phil., Ass. Prof., language advisor
Khmelnytsky National University

SOCIAL NETWORKING IN EDUCATIONAL SYSTEM

The aim of this work is to analyze the social networking and determine its importance in educational system.

With the development of modern society information technology enters deeply people's lives. The use of IT does not solve allproblems but significantly speeds the work incomplexmoments of learning activity. The use of information technology in the science and education field is difficult to overestimate. A lot of e-libraries are

available today.You can use them being at home which makes the learning and self-education process much easier.

In its turn web-resources aimed at communication are divided into the following categories:

1. Chat
2. Web Forum
3. Blog
4. RSS
5. LiveJournal
6. Social Network

The Internet comprises at least two components: forms of telecommunications and information resources.

Telecommunications forms embrace email, chat, forum, ICQ, video-, webconferences and social services Web 2.0 (Web 2.0 is a platform of social services which allows a wide range of Internet users to be not only recipients but, which is important, to be its creators and collaborators - Odnoklassniki, Vkontakte, YouTube...)

Information Internet resources include texts, audio and video material in various subjects and in different languages. However, to ensure that students will not drown in a variety of different information content and its different qualities but make the most productive use of it for their educational and professional needs, the necessity to develop special educational online resources appeared. They are aimed at teaching how to work with internet resources. These resources include hot letter, multimedia, Skrapbook, Treasure Hunt, Subject, Sample, WebQuest. These online resources are created particular for educational purposes. They can be designed in different subjects.

Social networks are very popular today. The term "social network" in information technology area is defined as an interactive, designed for many users website with content that is filled by the members of the network themselves. The most popular social networks among students of Ukrainian universities are "VKontakte», Facebook, Twitter and others. The use of communicative means in the relations system of "teacher - student" such as correspondence via e-mail, electronic magazines, hands-on training has become a usual thing today. However, the social networks use in educational activity allows participants to create online educational content, makes it possible to perform group tasks by applying additional options such as forums, comments, quiz, voting. It also facilitates the information exchange process and allows the implementation of the continuous studying principle.

The basic principles of the social network include:

• providing with personal information (school, college, birth date, favorite activities, books, movies, skills etc.);

• seeing who is currently online and engaging in dialogue with other participants;

• finding out about another participant’s status, tracing his/her behavior within social network;

• sharing with other participants in important for them materials (photos, documents)

• describing the relationship between two users (friends, family members, friends of friends and so on);

• communicating with other network members (to send private messages, comment on material);

• forming within a social network a community in accordance with common interests. [1]

Students have the opportunity to be aware of the changes that take place in the educational activity process, track classmates’ educational activity as well as teacher’s who in his/her turn traces and coordinates students work because activity of users is visible in the news. Social networks will be helpful in technical difficulties that are classrooms outfit with the necessary equipment to demonstrate visual materials in electronic format: a file, a link to download the file from the file exchanger, in a link to view your downloaded file lecturer without difficulty shares with students. They in turn have opportunity to get acquainted with the file content at any convenient time. Paper save is rather strong argument for the use of social media in the visual handouts dissemination.[2]

Joint electronic educational resources filling and social networks offer students the opportunity to share what they learned and what they found interesting in the network with the whole world. In addition, the social networks are provided with an option of involvement in the educational process of "third" persons: experts, consultants, specialists in the study area.

A person is more often logged in a social network under his/her own name and surname and more seldom under a pseudonym. Other Internet services provide the opposite. The positive aspect is also that students do not need to memorize new username and password to log in. He/she uses a common way to identify himself/herself in the community. Social network helps a teacher in better visual memorizing of students and understanding their interests, develops for him tasks that would interest students and provide better learning.

The use of social network is rather an important resource for learning because it has a number of positive features:

- Familiarity with interface and communicative environment for learning saves students’ time to adapt to the new educational space;

- Many resources are free, however, they have significant functionality to the educational objectives implementation;

- Social services functionalityallows not only to save but also to create and share digital content; eventually students take part in the process of knowledge creation and exchange;

- Multimedia capabilities of video, audio and interactive social networks can significantly vary the idea of educational material;

- Educational activityin social networks promotes motives forlearning that are related to self-realization, self-expression, fear to fail, motives of prosocial behavior etc.;

- The use of forums, blogs, wikis technologies and other Web 2.0 tools allows either alone or together to create educational material which in turn stimulates independent cognitive activity, encourages students in the educational process, developes critical thinking, reflection and others;

- Learning through social media allows to build skills connected with the ability not only to find information, but also to alter it and on its basis create new one;

- Support of learning with the help of social services gives the possibility not to be limited only to formal classroomor in-class learning but also to expand educational community by providing educational support in extracurricular time. [3]

The social network use in university educational process has several disadvantages:

1. The lack of tools specially designed for educational purposes (e.g. maintenance of electronic report or journal)
2. The lack of access to social networks in classrooms
3. The large amount of entertainment content compared with educational one.

However, social networks are a powerful and efficient tool with a wide range of positive and unique features, the potential of which we need to use in modern education. [4]

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A. Zakharova, Master student,
D. Shostachuk, PhD, Ass. Prof., research advisor,
N. Krushynska, lecturer, language advisor,
Zhytomyr State Technological University

ORIENTATION METHOD OF SATELLITE WITH PREDICTIVE MODELS OF DISTURBANCES AND MAGNETIC MOMENT OF FORCE COILS

Despite the difficulties caused by the transition to a market society, Ukraine stays as the space state and the traditions that have been accumulated in the space tool and rocket building over the past decades must be developed. This is also applied to systems of managing trajectory of the satellites.

The trajectory of the satellite is different from the orbits of celestial bodies naturally occurring mainly by the presence of active sites, which included satellite movements from a jet engine or magnetic drive. The orbits of satellites continuously change under the influence of disturbing forces. Specified values are used to predict the orbits of satellites movement in these observations.

In the master project it was offered the changing motion of satellites using the Earth's magnetic field and the magnetic field of the force coils. The coils will be connected to a power source to the points where the amplitude of disturbances is maximal.

In the software environment Mat LAB (tools package Simulink) we simulated two systems: a system of continuous motion control of satellites and a system of motion control of satellite that is based on the method of using predictive points of disturbances. On the input of each system harmonic signal is supplied (Figure 1):

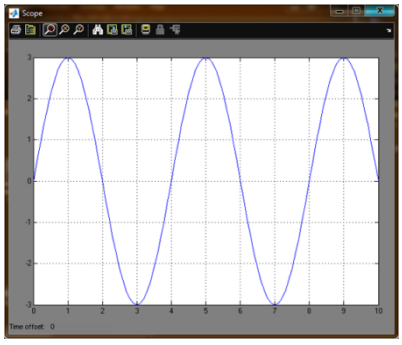

Fig.1. Image of input signal

Scheme of continuous control of satellite is shown in Fig. 2. In this system transfer function of the feedback is used as a controller. The system continuously controls the adjustable parameter and produces a control signal. Effect of continuous

control of satellites is visible in Fig. 3, which shows the graph of the output signal of the system.

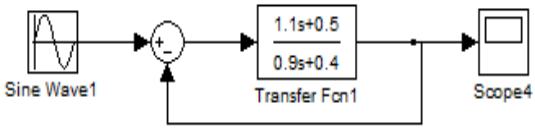

Fig.2. Scheme of continuous motion of controlling satellites

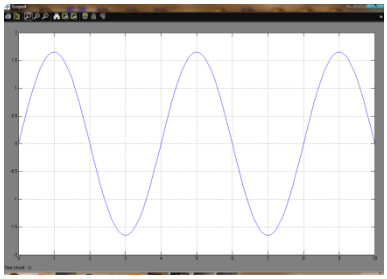

Fig.3. The output signal of continuous control system

Scheme of satellite motion control is based on the method of magnetic orientation shown in Fig. 4. In this system periodic signal generator Repeating Sequence Stair was used as a regulator which would react to disturbance at certain time. Object with the transfer function $W(s) = \frac{1.1s + 0.5}{0.9s + 0.4}$ was adopted as the model by the satellite.

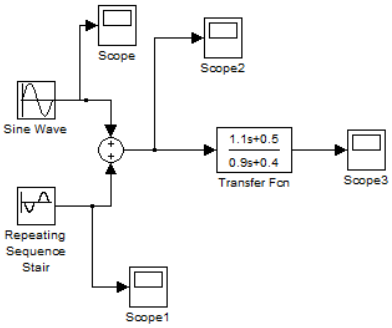

Fig.4. Scheme of satellite motion control system based on the method of magnetic orientation

As can be seen from the graph of output signal of object (Fig. 5), the system periodically generates the necessary step pulses what cut off effect of geomagnetic disturbances on the trajectory of the satellite in those moments when the disturbance reaches its maximum value and can significantly change the trajectory of the satellite. The result of the use of motion management system of satellites based on the method of magnetic orientation is clearly visible on the graph of the output signal (Fig. 6).

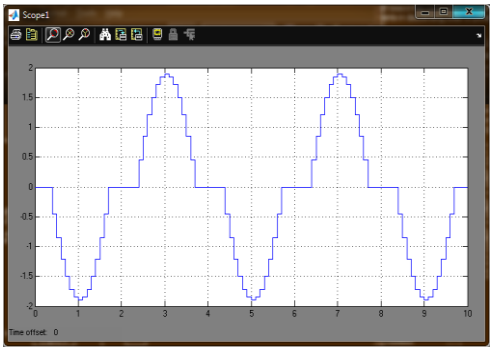

Fig.5. The image of output signal of generator Repeating Sequence Stair

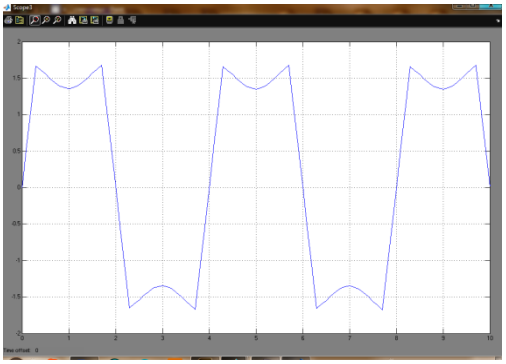

Fig.6. The output signal of management system that is based on the method of magnetic orientation of satellites

Analyzing graphics signals both systems were identified power consumed by the period: P1 = 6.8W (continuous control system satellites) and P2 = 3.412W (proposed system of a motion control of satellites). Thus we can conclude: the proposed control system is less energy-intensive, because it worked only in moments of maximum action disturbances, in contrast to the continuous system what always operate with the managed object. Reduced cost of control system minimizes energy consumption and hence to life extension of satellites.

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D. Zavadsky, student
V. Kovalchuk, PhD, Ass. Prof., research advisor
S. Kobzar, Senior lecturer, language advisor
Zhytomyr State Technological University

THE KEY FEATURES AND PROBLEMS OF MODERN SOFTWARE PROJECTS

Experience in creating software systems shows that this is a complex and time-consuming work that requires highly skilled professionals involved in it. However, up for now the establishment of such systems is often performed on an intuitive level,

using formalized methods based on the art of practical experience, expert opinions and costly experimental verification of the quality of the software operation. The problems of creating software depend on its properties. As early as 1975, Frederick Brooks, having analyzed his unique (at that time) experience in management of the largest projects of developing the operating system OS /360, made a list of the inherent properties of software: complexity, consistency, changeability and invisibility [1].

At the end of the 60s of the last century in the United States a phenomenon called "software crisis" was noted. This was expressed in the fact that large projects were performed behind schedule or within budget, designed products did not possess the required functionality, performance was low, the quality of the software did not suit the consumers [2]. One reason for the prevalence of "the chaotic" process of software development was the desire to save money on the stage of development without spending time and money on training and implementation process of software development. The same reason was for the "heaviness" of technological processes. "Heavy" process has the following features:

- the necessity to document every action of developers;
- a lot of work products (primarily – documents) produced in the bureaucratic atmosphere;
- the lack of flexibility;
- determinism (long-term detailed planning and predictability of all activities, as well as the distribution of human resources for the long term, covering a large part of the project).

The alternative to "heavy" process is adaptive (flexible) process based on the principles of "rapid software development", intensively developed in the last decade. It should be clearly understood that for all the merits of rapid software development, this approach is not universal and is applicable only to projects of a certain class. To characterize such projects Alistair Cockburn has introduced two parameters – the criticality and the scale. Criticality is determined by the consequences caused by the defects in the software, its level can be one of four values:

• C – defects cause the loss of a menity;
• D – defects cause the loss of recoverable resources (material or financial);
• E – defects cause the loss of irreplaceable resources;
• L – defects pose a threat to human life [3].

The determining factor for the development of software engineering is the desire of software companies to increase their productivity, cut time to market, control costs and quickly obtain benefit from the investments [4]. These goals promotes the use of development environments that can reduce the complexity of the

processes of software development, increase their efficiency, reduce development costs and maximize the potential of new technologies. Systematic, reasoned approach to the selection and use of Software Technology can reduce the time and improve the quality of software development, provide a high degree of independence from specific developers, as well as reduce the cost of software development and maintenance .

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Session work №3

MODERN RESEARCH IN THE FIELD OF ECONOMICS

UDC 37.062.2

Homyak I.V., Bachelor student
O. Proskurovych, Ph.D., Ass. Prof.of ASME, research advisor
L Petliovana, PhD, Ass. Prof., language advisor
Khmelnytskyi national university

INFORMATIVE CULTURE OF STUDENTS IN MODERN SOCIETY

The development of modern society has essential changes in the area of interaction between human and information. Conception of information culture was formed in the information society when information became a key strategic resource and new technologies for its storage and processing were created. In modern conditions, information culture is the culture of a new type.

Information culture is an area of culture which is related with the functioning in society and forming the information qualities of personality; harmonization limit of her inner world in the process of mastering the whole range of socio-important information; ability to operate purposefully with the information, use modern technical means and methods to its receipt, processing and transfer, mastering the modern information technology [3, p.5].

In today's world people should find, retrieve and use information in domestic and professional areas of life in time. So, an important task of education in Ukraine is to prepare the young generation for rapid perception and processing of large amounts of information, equipment with latest tools and technologies, formation of information culture.

Informatization of society and all industries of national economy requires from graduates high qualification, computer literacy and the ability to work in the information environment. The final goal of education is to prepare competent users of computer technology, who can independently use software for processing text, tabular and graphical information, work in computer networks, and have a working knowledge of hypertext and multimedia [2, p.277].

Computer literacy makes it difficult to acquire new knowledge and skills for working with information, but provides the ability to solve practical problems with

specific information. That is, training should be focused not so much on the scope and completeness of specific knowledge as on the ability to replenish our knowledge independently, formulate and solve different problems, look for alternative solutions, develop criteria for selecting the most effective ones. Achieving this goal is largely dependent on the level of information culture.

Relevance of forming students' information culture and literacy is connected with the expansion of influence on young people of the media, so it necessitates individual approach to the development of critical thinking of students, the formation of a protective mechanism to significant influence of the media, which on the one hand, cause noticeable growth of intellectual and cultural potential of the individual, and on the other hand promote violence and aggression.

The problem of forming the information culture of future graduates in terms of computerization is of a particular importance, and an information activity is a factor and indicator of informative culture of students. The main organizational and pedagogical conditions of forming the information culture of students are: integrity, continuity and consistency of information culture of the student; forming the content and structure of the educational process in accordance with the objectives and main components of information culture; arranging at the university information environment that encourages to creative information activities; forming the positive motivation of students to information activities; engaging students in intensive information activities, creating information products professionally important in the study of various disciplines [1, p.185].

For higher educational establishments the social order of the information society should be considered as an adequate level of information culture of students required for a particular occupation. During the inculcating information culture in students in higher education along with the study of theoretical computer sciences, much attention should be paid to computer information technology, which is fundamental to the future areas of activity. And the quality of education degree must be determined by fixed sustainable skills in basic information technology environment for solving typical problems of future professional activity.

Consequently, the need for the formation of information culture of students is caused by the fact that information support of educational process in educational institutions of all types and levels is being changed, information infrastructure is being formed, and the network of information and knowledge base of electronic educational and scientific communication is being expanded.

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O. Kotenko, Master student
G. Tarasyuk, D. Ec., Prof., research advisor
L. Fursova, Senior lecturer, language advisor
Zhytomyr State Technological University

MODERN SYSTEMS OF INCENTIVES FOR WORKERS

In a rapidly changing world it is important to keep pace with global developments in work motivation. It brings passive tangible results, when an employee loses interest for labor. To prevent loss of potential profit a manager must maximize the return on their subordinates. A properly designed work should create internal stimulation, a sense of personal contribution in manufactured products. Men are social beings, and thus, a sense of ownership can cause their deep psychological satisfaction. It also allows them to understand themselves as personalities.

The system of motivation of a company takes a leading role in all internal factors affecting the development of enterprises and organizations. Incentive systems should generate a sense of justice of tangible rewards and enhance the interest of workers in improving not only individual work, but also work as a "business relations" with other employees. Employees have to see a clear correlation between the results.

Studying the impact of stimulus acts as a basis for an effective work for those who are really seeking for realization of their talents and capabilities and for those who are sincerely interested in their work as well as in the results of a company activities.

Statistics on survey of companies shows that about 50% of employees consider money to be the main incentive for work. Now the main labor motive for our fellow citizens is a financial factor. However, it does not mean that labor efficiency depends on this particular factor only, because such incentives are related to many of them.

It is not enough to have a desire to work effectively. That's why, availability of necessary conditions for this is the important factor that strengthens labor discipline and ensures development of labor activity and initiative.

To generate moral incentives among workers it's necessary to improve the ways of labor activity increasing. Initiatives of workers include:

— enhancement of their awareness and involvement in the problems of a company;

— identifying of target parameters of a subsection activity (complexity reduction, product quality improvement, reduction of production costs);

— forming of innovative target groups;

— training of employees;

— providing of conditions for innovative activities;

— moral support of employees' initiative and its financial coverage, including priority by promoting the most enterprising workers.

As for a financial aspect, we offer the following modern elements of stimulation of workers:

— pay for qualifications – the essence is that the level of payment depends not only on the complexity of work, but also on a set of specialities which an employee is able to use at his work. It means that acquiring every new speciality a performer gets an increase in salaries, and this knowledge must be used in his work;

— today the triad of monthly, quarterly and annual bonuses is considered to be a financial motivation in competitive job market conditions. Monthly and quarterly additional benefits are much more important for employees. This system is more understandable for an employee;

— a good tool for long-term employee motivation is the use of a grading pay system. The grading system is, in fact, the formation of a post rater. Grades are posts that have the same value for a company. Each grade corresponds to a certain amount of salaries. Besides, people of different professions can get the same grade, for example, an accountant, a sales manager and a specialist who provides a company with legal services. Grade system ensures a clear understanding to a worker within the hierarchy extent where his position is.

Assessing the effectiveness of workers one must take into account negative effects in employees' labor. Such effects include negligence, failure of technological and production discipline: reprimand about performance of official duties; rude communication; provide insufficient information, etc. So, it is useful to set up the antibonus system (tab. 1), which provides a list of violations indicating the reasons when employees are deprived of their premium.

Table 1

Antibonus system for an enterprise

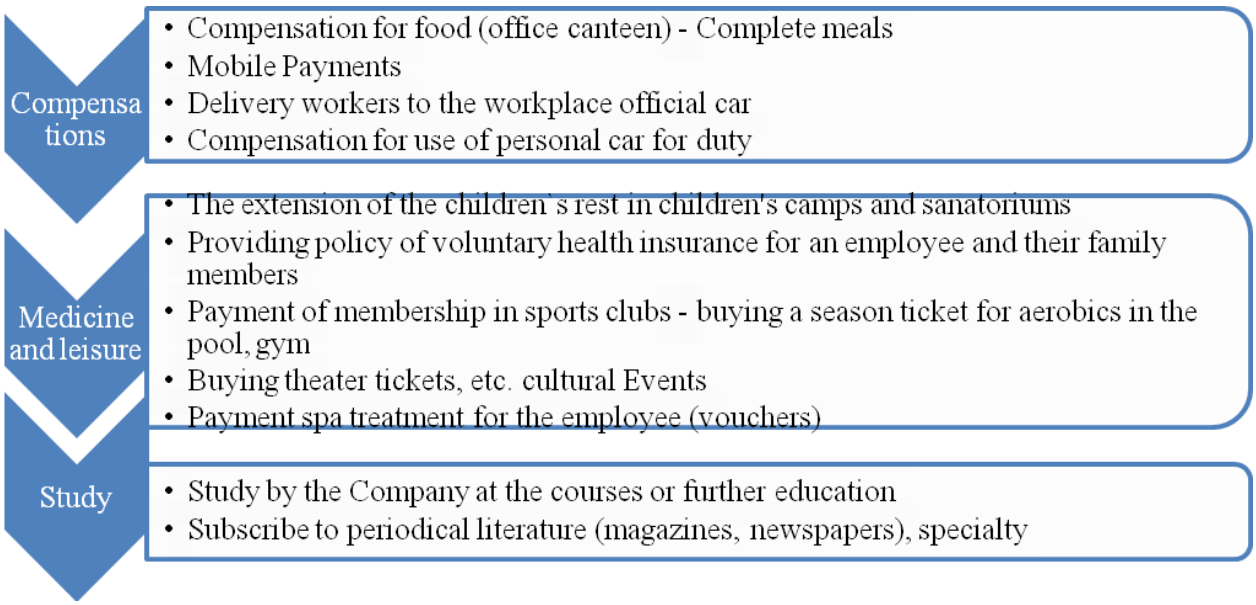
The business unit	Possible violation	Antibonus
1.All workers	1. Delays, poor performance or failure to fulfil production tasks, orders	Award Reduced at 50%
	2. Violation of safety rules, rules of technical operation, fire safety, traffic rules, manufacturing instructions and rules of internal labor order	Award Reduced at 3-15% depending on a violation
2. Accountants and employees of Sales	1. The financial abuse	Full Fines
	2. Late payments for contracts	Award Reduced at 3-6% depending on a violation

3. The staff of material and technical supply department, warehousing department	1. Failure to purchase material and technical resources under contracts	Award Reduced at 5-7% depending on a violation
	2. Accidents caused by an employee's fault	Full Fines
4. The staff of manufacturing department, shops	1. Failure standards of product quality	Award Reduced at 2-30% depending on a violation
5. The staff of shops, service of chief mechanic	1. Failure to schedule maintenance, preventive maintenance, work above the established downtime	Award Reduced at 5-20% depending on a violation

Distributing a prize fund and establishing additional incentive allowances special attention should be payed also to a social package.

The social package is the remuneration received by an employee for having been employed by a company, and is not related to an amount and quality of work performed. Challengers are increasingly paying attention to it.

Experts consider the social package to affect positively on the quality of standard of employee's living. It also shows that an employer refers respectfully to his employee and his employee's work. The social package may include a medical insurance, free meals, the compensation of transportation costs and the costs for mobile communication, an Internet access, the pay for tuition and for advanced training, providing of interest-free loans for buying a house or a car, the pay for housing for nonresident employees. We offer the following system of social compensation (pic. 1).



Pic. 1 System of social compensation

To summarize, it should be noted that these models of stimulating are beneficial for both management and personnel.

Implementation of the suggested measures requires to assign a responsible for their conduct. Their rational use at a company will contribute not only to the operation, but also to the development of a company. A personnel center may be created to do this.

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A. Kysel, Bachelor student
I. Zhygley, Doctor of Economics, Prof., research advisor
M. Baida, language advisor
Zhytomyr State Technological University

IDENTIFICATION OF CORPORATE SOCIAL RESPONSIBILITY THROUGH COMPANY'S SOCIAL EXPENSES: UKRAINIAN AND FOREIGN PRACTICES

Nowadays, the companies of all over the world are interested in running their business according to the concept of sustainable development. It influences the decisions they are making in various spheres including social responsibility. Social expenses reflect the level of corporate social responsibility (CSR) of the company. Therefore, the identification and reporting of these expenses in the statements is one of the key issues while running a business.

It is obvious, that the business has a huge impact not only on the small group of consumers, but also on the society as a whole. At first, there was just the fear of the depletion of natural resources. Later the entrepreneurs have realized that they cannot make profits and get other benefits without the contributions to the society welfare. It means they are responsible for maintaining and improving natural, capital and human resources for the present and future generations.

In mid-nineties of the 20th century Gardiner Means stressed the role of corporations and suggested that the big company could not be private entity, it is collective phenomena. In his work "The Corporate Revolution in America",he wrote that the corporations have a hundreds of thousands of workers, stockholders and consumers. Thereafter the corporation cannot be separate from the society. It becomes the one of the social institutes, whichis responsible for solving society problems [1].

Last two decades the influence of standards of CSR and business ethics has grown dramatically. International organizations have developed a lot of guidelines and standards, which guide the companies in their activities. For example, G4 Sustainability reporting guidelines, OECD Principles of Corporate Governance, Social Accountability 8000, ISO 26000 Social responsibility etc. As one can see, the legal issues of social responsibility are regulated by the international standards.

Ukraine does not have its own guidelines. This kind of legislation does not have a significant impact on the majority of Ukrainian companies. However, if a Ukrainian company has the external relations or has a subsidiary in a foreign country, it is forced to follow the main requirements of international standards. The majority of these standards have voluntary base. Nevertheless, the violation at least one of it can lead to the company's social death and even bankruptcy.

The social responsibility is not just a theory. It requires an effective social performance. The company's social performance has several dimensions: corporate philanthropy, corporate social initiatives, corporate responsibility and corporate policy. It assumes charitable donations to non-profit organizations. For example, the Foundation, which is created by Bill Gates and his wife Melinda, is the nation's largest philanthropic foundation. Social initiatives are mostly connected with the company's business sphere, for example, it can minimize its harmful impact. Corporate responsibility includes everything from hiring the workers to making ecological products, minimizing the influence of pollution, providing a safe work environment and economizing energy and water. Corporate policy refers to the position a company takes on social and political issues [2, p. 99].

Obviously, everything that has to do with acting responsibly within society requires the expenses. This performance cannot be successful without spending on it. If the company spent some resources on CSR activities, they would be the social expenses of the company. It is interesting to pay attention to the fact that the effect from the expenses spent for social events can overcome the effect of advertising costs.

Social expenses can be directed to economic development, for example, through funding of innovations or managing risks. Another direction is ecologic sphere that assumes expenses on technologies, which do not pollute air, ground or water and minimize the wastes of the company. In addition, the investments in non-profit organizations is a part of social expenses, which are directed on social progress.

All these expenses should be reported in a proper way. In Ukraine and other countries, the expenses on CSR activities are not included into Chart of accounts that is they do not have a separate account for accumulation. Accounting for social expensesis carried out through 949 "Other expenses of operating activity" account. However, this account includes a variety of other expenses that are not related to the social ones. The same situation with financial statements. Income statement in Ukraine and other foreign countries include item "Other operating expenses" without the specification of the social expenses. We believe that this way of reporting social expenses is inappropriate. It is not effective one because it is difficult to estimate the level of CSR or proportion of these expenses at least.

The problem of identification of social expenses in company's statement is solved with the help of the social reports or non-financial statements. Such kind of reports appeared more than thirty years ago in the chemical industry. In Ukraine, the first social report was published by holding "System Capital Management" in 2005.

One of the first social reporter was “NadraBank” according to GRI [3, p. 33]. Social reporting in Ukraine is growing, but it does not keep pace with the foreign countries.

There are three types of non-financial reporting. They can be created according to the international standards of sustainability, as a complex report or in a voluntary form. The last one is the most popular among all companies, particularly in Ukraine, because it does not need a social audit. In contrast, the standardized report is more comparable with other international reports, which allows to identify company’s social rating. The most applicable are GRI, United Nations Global Compact, AA1000, SA8000 and Sunshine Standards.

The social reports of voluntary form are different from each other. The indexes are used selectively. Irrespective of the insufficient quantity or lack of measurement in monetary units, the social report is useful for those users who cannot understand financial indicators.

It is possible to avoid this disadvantage by creating integrated report of both financial and social statements. For instance, listing on Johannesburg Securities Exchange requires preparing complex report, which includes financial statements and statements of sustainable development. Also, the big companies in France, Great Britain and Denmark are obligated to add information about CSR to their financial statements [3, p. 31]. It is necessary to design the special legislation for social reporting in Ukraine either.

To sum it up, the identification CSR through company’s social expenses is rather important because it helps make company’s reputation better. It stimulates the demand for goods and services more effectively than the traditional marketing methods. In addition, the level of social expenses are interesting not only for business parties, but mainly for public and charitable organizations. Through their cooperation, it will be easier to direct money to those social programs, whichbring maximum benefits for the whole society and particularly for the company. That is why it is mandatory for Ukrainian big companies to take into account the international social reporting standards or design its own in accordance with the national accounting and reporting peculiarities.

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I. Myronets, Master student
G. Tarasyuk, D. Ec., Prof., research advisor
L. Fursova, Senior lecturer, language advisor
Zhytomyr State Technological University

MAKING LOGISTIC DECISIONS IN THE FRAMES OF ENTERPRISE LOGISTIC SYSTEM

Any management activity, especially in logistics, is closely connected with making of appropriate decisions. The effective implementation of management activities depends on rationality and reasonableness of these decisions. The application of integrated decisions has a new value as well as attracting of integrated approaches to management.

Creation of logistic systems and adoption of logistic decisions is an example of such an approach. Logistic approach has wide possibilities for improving functioning of enterprises. The adoption of weighted logistic decisions can help reduce the cost of production not only due to traditional increase of production, but also due to more rational organization and synchronization of all the material flows.

The basis of all the logistics decisions is the integration of individual subsystems of an enterprise into a single system able to adapt quickly to changes in external and internal environments.

Activities of a company as a logistic system, includes the following three blocks:

1. supply logistics which includes management of the movement of materials, raw materials, components and informational flow from suppliers to primary production storage;
2. production logistics includes management of processes from the beginning of production to transferring the product to marketing;
3. sale logistics covers management of the movement of a finished product to a customer.

So, a logistic system is an integrated and adaptive system which includes the combination of such elements (subsystems) as manufacturing, transportation, warehousing, and supply including relations between them and between their properties. It causes moving of the flows of materials, funds and information.

For efficient management a company should ensure proper functioning of a logistic informational system. Reliable and timely information is the main criterion for making logistic decisions. Various informational flows circulating within and between elements of a logistic system, between a logistic system and an external environment form a logistic informational system.

Making of logistic decisions for enterprises contributes to:

1. building of market-oriented production process;

2. establishing of fruitful partnerships with suppliers;
3. reducing of downtime;
4. optimization of resources;
5. reduction in the number of additional workers;
6. improving of product quality;
7. improving of production and warehouse space use;
8. shortening of product movement duration.

So, to improve the system of logistic decision making at an enterprise as a part of its logistic systems, first of all, you need to have information about functioning of the logistic system of a company.

It's necessary to improve both the system of taking orders and the system of alternate customer service. It is also suggested to apply the system of goods insurance. The use of their bar coding will help to trace the path of products from a supplier to a customer.

At all the stages of a logistic process you must have the system of constant quality control and also upgrade of all the equipment, if only funds are possible and available. Due to such requirements a company will operate more smoothly and efficiently and will be able to earn extra income.

Therefore, in the context of constant increasing competition the problem of optimal use of existing funds arises. Effective functioning of a logistic system and its adoption suits in the frameworks of effective logistic decisions to achieve this goal best. Due to its optimization and modernization, an entire production process will improve and revenues of a company will increase. This will also provide further coordinated functioning of a company and the possibility to obtain certain advantages over competitors and to survive in the market.

UDC 164

V. Ratushniak, Master student
A. Vitrenko, PhD in Economics, Ass. Prof., research advisor
Yu.Sviatiuk, PhD in Philology, Ass. Prof., language advisor
Taras Shevchenko National University of Kyiv

THE MAIN ASPECTS OF INTELLECTUAL PROPERTY COMMERCIALIZATION AND POLICY REGULATIONS

The article considers the way to improving policy and regulation of Intellectual Property Commercialization in Ukraine.The paper specifies the essence of intellectual property commercialization, and the essence and purpose of government regulation of that process.

Key words: intellectual property, intellectual property commercialization process, government policy.

Companies are increasingly investing in creativity, innovation and other forms of intellectual assets generally known as intellectual property or “IP”. Investment in IP is a vital strategy to grow, stay competitive and deliver innovative products and services to the marketplace. Governments also are increasingly recognizing the critical role of IP in driving innovation, development and jobs, and are investing in national capabilities for innovation and creativity. Moreover, they have increased investment in academic research, incubation centers and public-private R&D projects; and they are delivering better services to help companies develop and commercialize trademarks, copyrights and patents[1].

Countries with economies in transition face additional challenges to integrate into the increasingly global production networks and to find their own niche in the increasingly global value chains. To be successful, they need to assign high priority to developing their own innovative capacities, as well as their ability to absorb/borrow and adapt technological innovations from abroad, and to move up the value chain over time. Again, IP regimes have a key role to play in this regard.

To be competitive in the globalized economy, countries have to maintain, adapt and create institutional and legal frameworks conducive to the creation of knowledge and its commercialization. Intellectual property rights have a key role to play in this regard.

Some aspects of state regulation of intellectual property are adequately covered in the works of foreign and domestic scholars, among which V. Bazylevych, I. Nevinchanyy, T. Golubeva, S. Bondarenko, A. Chukhno, G. Stupniker etc.

However, international experience of commercialization and regulation of intellectual property and the possibility of its adaptation in Ukraine is required further study, which forms the relevance of research [3].

The article aims to clarify the content/ meaning of the commercialization of intellectual property and the policy steps.

Intellectual property (IP) is a collective term for intangible/immaterial property protected by law. It refers to registered or capable of registration inventions, discoveries, materials, technologies, products, data, algorithms, software, know-how, patents, databases, copyright, trademarks, design rights, expertise, trade secrets, copyright, and plant breeders rights which have come about through the mental efforts, insights, imagination, expertise and creativity of employees and students which are recognized and protected by law [1].

Commercialisation is the process of bringing intellectual property (IP) to the market in order for it to be exploited in return of business profits and growth. The financial success of any IP commercialisation will certainly depend on the choice of the most appropriate commercial tool, which should be based on:

1. The organisation’s business objectives;
2. The form of intellectual property;
3. The economic resources at its disposal.

There exist several practices to get a protected IP into the marketplace. The most common can be resumed in the following diagram:

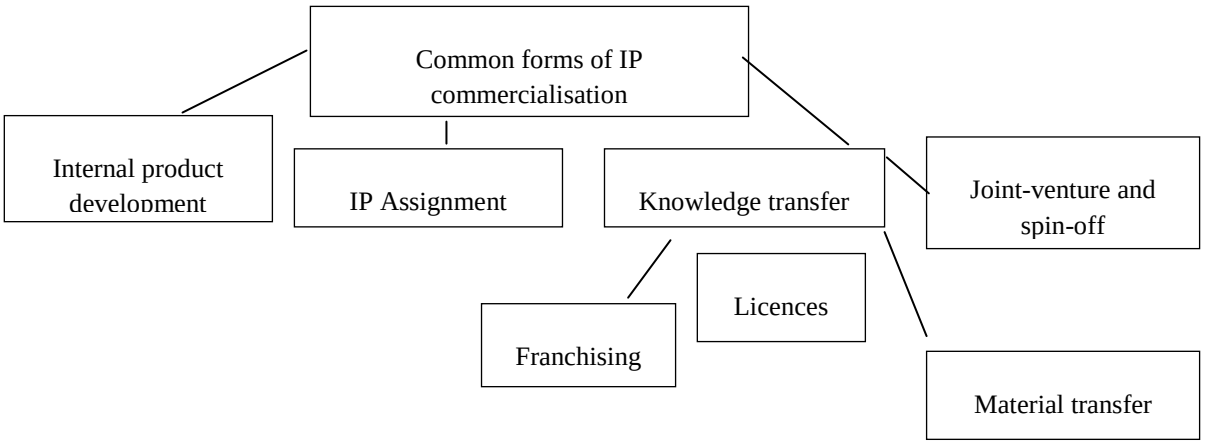

Diagram 1.Forms of IP commercialization [4].

There are measurements for successful commercialization policy:

- Increase in number of patents etc.,
- Number of incubated companies, number of innovations, number of community projects, etc.,
- Industry partnerships (projects),
- Involvement in Technology Transfer initiatives,
- Number of collaborative agreements concluded,
- Number of successful implemented industrial agreements, research contracts and projects / Value for money.

Value of IP in Ukraine : the time is right for Ukraine to promote and protect intellectual property rights (IPR). Strong IPRs benefit the economy, attract foreign direct investment, promote innovation, bolster R&D, and technology transfer, help firms monetize their inventions and grow, empower small- and medium-sized enterprises, and more generally benefit consumers and society [2].

Key legislative and policy recommendations: the value of fakes in Ukraine is estimated to be around USD 1.3 billion according to the Ukraine Alliance Agreement Against Counterfeiting and Piracy. Illicit goods proliferate on the black market. According to other estimates the losses of counterfeit goods for Ukraine were close to USD 710 million while the combined losses of music, movie and software piracy added us to USD 720 million in 2013 [4].

Therefore, such a significant problem requires action. BASCAP has put forward a set of specific legislative and policy recommendations to serve as a roadmap forward.

Summary of policy and legislative recommendations: Design a comprehensive national IP Strategy that identifies needed legal and policy reforms, delineates

implementation and enforcement responsibilities and allocates sufficient resources to ensure effective enforcement.

Adopt and implement a significant number of policy and legislative reforms Establish a new high-level IP authority. For coordinating and implementation of the IP Strategy and the associated legislative and enforcement reforms - to build respect for the rule of law and for property rights in Ukraine.

The main problems for the perspective further research of commercialization processes are:

1) regulatory and legislative framework – the contradictions and conflicts of three regulatory areas of law, tax and accounting;

2) assessment of the problem of intellectual property –there is none single national standard in the evaluation of intangible form;

3) staffing problems – lack of qualified experts on intellectual property;

4) anti-market mentality of much of the population, in which stereotypes of science and research and development – is not the object of market relations, and elements of the so-called "non-productive areas."

The process of attracting foreign capital to the formation of the intellectual property market in Ukraine is hampered by many factors, such as unstableand over-regulation and high tax burdens; fuzzy legal system; variability economic and political environment; problems in establishing clear property rights; difficulties in dealing with government agencies privatization and corruption; lack of infrastructure; low incomes; problems of access to domestic and foreign markets[5].

The adoption and implementation of sanction measures will provide a new level of economic relations and will help stimulate the development of legitimate intellectual property market through legitimate use of intellectual property, its commercialization will help to increase the legal culture of the population in this area and develop a civilized market of intellectual property rights.

Conclusions.Ways to improve policy on the commercialization of intellectual property:

— To develop clear mechanisms of legal regulation, namely codification of legislation (the creation and adoption of the Code of Intellectual Property);

— A combination of science and industry, which involves the introduction of a set of measures (research and market analysis, financing, implementation of intellectual property, research and development, etc.);

— Infrastructure implementation of scientific and technological activities in manufacturing;

— Creation of closed cycles (idea-production-consumption);

— Creationof special complex structures whose functions have included a peer review of their commercial potential, study market conditions, providing the latest developments of financial support, care manufacturing competitive products,

promote intellectual property on both domestic and foreign markets, to prevent unauthorized use and dissemination of intellectual property;

— Creation of a national system of training and professional development of intellectual property.

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UDC 005

Y. Shchypanova, Bachelor student
V. Shchuka, PhD, Ass. Prof., research advisor
L. Petliovana, PhD, Ass. Prof., language advisor
Khmelnitsky National University

ECONOMIC ANALYSIS AS A COMPONENT OF ENTERPRISE MANAGEMENT SYSTEM

The purpose of this work is to determine the characteristics of rational managing the economic analysis of the company activity and to generalize the results of the analysis.

In current economic conditions, it is extremely necessary for the head of any enterprise to have sufficient economic information for adequate evaluation of the situation and making optimal management decisions.

Analytical information plays a special role because it shows the main indicators of financial and economic activities that cause the greatest impact on the finances of the company. Then becomes possible a comparative analysis of the results with standard values and more. Analyzing depends on the organization designed to establish, manage, and bring to systemic standards information and methodological support.

Data analysis concerning the rational organization of economic analysis at the enterprises offers to follow an algorithm on implementation of analytical work. In this case it is necessary to follow such an algorithm: develop a plan of analytical work; clarify the purpose and objects of analysis; identify the responsible people and terms of solving certain issues; prepare materials for analysis, test them and analytically process them; identify and explore the factors and the causes of deviations of actual values to planned; identify the influence of factors on the performance and unused reserves; evaluate and summarize the economic activity of the enterprise; the results of the analysis draw by the order of the company [2, c. 161]

For analytical work at the diagnosis of an enterprise it is advisable to apply such methods of financial and economic analysis: analysis of absolute figures, horizontal and vertical analysis of the balance and ratio analysis.

The analysis of absolute indicators allows to estimate the most important articles of reporting, having analyzed their dynamics in time.

Horizontal analysis of reporting is based on the comparison of development dynamics of balance sheet items and the report of profit and loss with the base year.

Vertical analysis allows to trace the dynamics of structural changes in data reporting.

The most important instruments of financial analysis are financial ratios, which represent a ratio of one accounting or financial index to another. To analyze the financial condition of the company using the ratios it is necessary to compare indicators of this year with similar indicators of previous years. This will help you to identify trends at the enterprise for each factor. Every company has the right to make their own analytic work system factors. However, we usually calculate four groups of indicators: the indicators of liquidity, financial stability, business activity and profitability.

So by using a specified complex analysis we can investigate both functioning of the enterprise as a whole and its separate departments, analyze the causal relationship between economic performances of the company, build quantitative dependences between them, and predict the development of the company in the short term.

Such a comprehensive approach allows to achieve the goal with limited resources and real business opportunities, and to develop ways for achieving it in the case of developing programs for the analysis of products and each business unit of the company.

Development Methods of such applications require maximum use of potential possibilities of the enterprise and production reserves [1, 265].

Nowadays the analysis is not possible without the use of computers that allows to save time for calculations, improve the efficiency of work and increase the probability of analytical conclusions. Currently there are many different computer applications for solving different problems of mathematical programming. They can be used by all companies in the analysis. The most popular are processors spreadsheets. Analytical service of specific companies, depending on their internal capabilities and needs, can carry out the necessary calculations using such specialized software packages like "Galaxy", "Fort: analyst", "Project Expert Prof", "Audit Expert Prof", "Etalon "," Statistica "," Deductor "etc.

Therefore, the organization of analytical work provides a systematic study of all factors that affect the business, as well as determine the extent of such effects and their possible consequences. This systematic and comprehensive economic analysis requires proper organization and focused analytical work.

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UDC 336.02

A. Shevtsova, a third-year student,
A. Raboshuk, PhD in Acc., Ass. Prof., research and language advisor
Zhytomyr State Technological University

COMPARATIVE ANALYSIS OF CORPORATE TAX RATE TENDENCIES

The Research Urgency. All the changes recently introduced into the Tax Code of Ukraine are to make functioning of the business entities more easy and to attract investments more effectively. However, the application of the Tax Code norms doesn't seem to be easy for the accountants. The important issues concerning the taxation policy in Ukraine are to be studied, as well as the grounded and sound decisions are to be made to ensure the high competitiveness of the Ukrainian business entities on the world market.

The purpose of the research is to study the overall tendencies in taxation, in particular corporate tax rates and their consequences for the Ukrainian businesses.

The United States has the highest corporate income tax rate among the 34 industrialized nations according the Organization for Economic Cooperation and

Development (OECD). The U.S. corporate tax rate of 39.1 percent is the third highest in the world, behind only the United Arab Emirates and Chad, which have rates of 55 and 40 percent, respectively. The U.S. tax rate is 16.5 percentage points higher than the worldwide average of 22.6 percent.

Among countries with corporate income taxes, Turkmenistan and Uzbekistan have the lowest top marginal rate at 8 percent.

It's interesting to mention, that there are currently ten countries without a corporate income tax, or the rate is 0%. Most countries without corporate income tax rates are small island nations, namely Bahamas, Cayman Islands, British Virgin Islands, and Bermuda.

The recent research shows that the average worldwide tax rate has been declining over the past ten years and it's true for all regions of the world.

Taking into account that Ukraine is on its difficult way towards the European integration we will consider the tendencies of the taxation in EU. First of all, it's worth mentioning that tax policy in the European Union consists of two components:

1) direct taxation, which remains the sole responsibility of Member States, and

2) indirect taxation, which affects free movement of goods and the freedom to provide services.

With regard to direct taxation, Member States have taken measures to prevent tax avoidance and double taxation within the EU. At the same, tax policy ensures that competition between Member States on the internal market is not distorted by differences in indirect taxation rates and systems. Measures have also been adopted to prevent the adverse effects of tax competition if companies transfer money between European Union Member States.

If one takes a closer look at the corporate tax, the following can be found. In the highly developed European countries – France and Germany the situations is quite similar to the world tendencies.

At the present, in France a 3.3 percent social contribution is levied on the part of the corporate income tax that exceeds EUR 763,000, resulting in an overall maximum tax rate of 34.43 percent. In addition, a temporary 10.7 percent surtax is levied on the (full) corporate income tax for entities with a sales turnover greater than EUR 250 million. This temporary surtax, which brings the overall maximum tax rate to 38 percent, applies until 2015. Still, specific categories of income can benefit from a reduced corporate tax rate under conditions, in particular, licensing fees relating to certain IP rights can benefit from a 15 percent corporate tax rate, as well as small and medium size companies with a turnover of EUR 7.63 million or less owned at least 75 percent by individuals are subject to a corporate income tax rate of 15 percent.

In Germany the corporate tax rate is 29.58%. The overall income tax rate for corporations includes corporate income tax at a rate of 15%, solidarity surcharge, and local trade tax, which varies between 7% and 17.15%. The local trade tax is not deductible as a business expense.

In Ukraine, the Corporate Income tax rate is a tax collected from companies. Its amount is based on the net income companies obtain while exercising their business activity, normally during one business year.

The Corporate Tax Rate in Ukraine in 2015 stands at 18 percent (the dynamics of the corporate tax rates is shown in Figure 1). Corporate Tax Rate in Ukraine averaged 23.11 percent from 2006 until 2015, reaching an all time record low of 18 percent in 2014-2015.

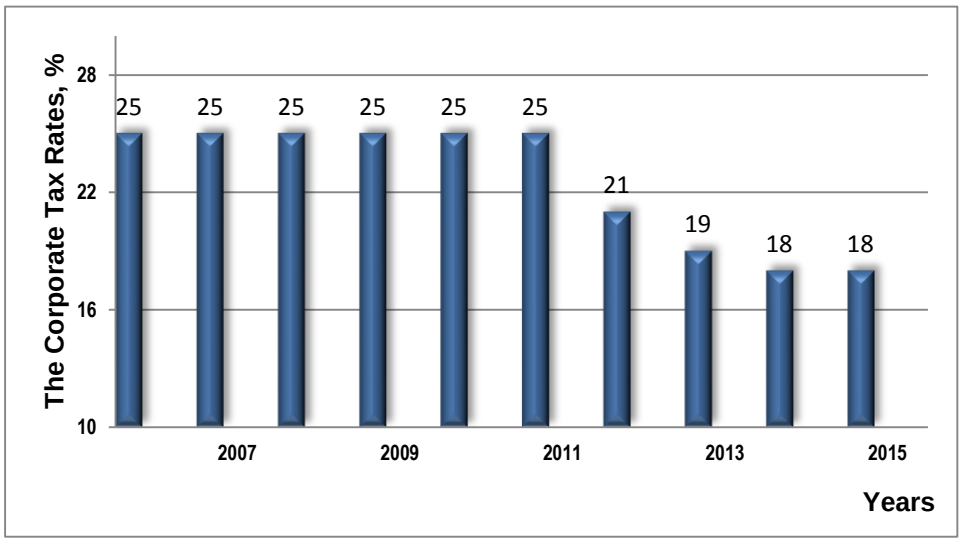


Figure 1. The Corporate Tax rates in Ukraine for the period 2006-2015
(Source: based on the materials from www.tradingeconomics.com)

Conclusions. It should be stressed that the corporate income tax rate is one of major elements of a state's tax code and it makes or makes not the economy of a particular country attractive for investments. As the study has shown, in general, the world's economies mature and, consequently, their tax rates on corporate income continue to decline. The same situation takes place in Ukraine, which can lead to the increasing of the competitiveness of the Ukrainian business entities and is hopefully to attract the foreign investments in the nearest future as well.

UDC 658.8

I. Varchuk, student
N. Borodkina, Ass. Prof., research advisor
I. Melnychenko, lecturer, language advisor
Zhytomyr State Technological University

PECULIARITIES OF TRADE MARKETING USE

At present trade marketing is becoming more and more popular in communicative activity of many companies. During last few years market's attitude toward trade marketing has been changed diametrically. It is no more considered to be a fringe of direct advertising but an independent direction, a medium of influence on important target groups; that is to obtain real results. Tendencies in development of Ukrainian market of indirect advertising are similar to those of Russian market, however Ukraine surpasses Russia in some spheres but is left behind in others. According to creative approach to trade marketing Ukraine goes at the head of the whole world. The fact can be proved by numerous achievements on inter-branch competitions (Silver Mercury, Golden Propeller). As to trade promotion, Ukraine is five years behind [1].

The problems of trade marketing have been investigated by J. Bolt, A.B. Cvetkova, J. Evans, A. Deian, H. Hergshen, V.V. Nikishkin, F. Kotler. But the unified and exact definition of trade marketing and peculiarities of its use have not been invented yet.

Therefore the aim of our research is to explain the peculiarities of use of trade marketing within the Ukrainian market.

Trade marketing is a marketing direction that deals with demand increase in terms of retail and wholesale trade, that is marketing communications and other measures of distribution and not on the level of end consumer.

The term "trade marketing" has a lot of synonymic names as a result of translation of numerous business literature sources with attempt to define different kinds of trade marketing and single out trade marketing as a separate direction of marketing activity. We reckon that trade marketing is an activity aimed at stimulation of sale in trading network and among trading intermediaries.

Summarizing all definitions we can assign 4 basic variations of trade marketing: BTL marketing (Below the Line marketing); trade marketing; promotion marketing or sales promotion; promo marketing or promotion marketing.

Above mentioned definitions state the increase of short-term purchased activity on market [2].

Trade marketing includes financial, competitive, price stimuli of trade intermediaries, trade personnel of a company and is used by companies permanently and everywhere. Trade marketing presupposes observations, active influence and analysis of results of influence on different channels and participants sales network.

Active influence is motivation to work with a brand by everyone who stands between goods and consumers, from wholesale operators to mini shops available at hand.

Trade marketing strategy must be accompanied by brand management because the successful work on the level of distribution presupposes overall demand. Consumer is a person who chooses specific goods in retail trade and in order to guarantee the choice of necessary goods, their qualities should be communicated on several levels. Trade marketing may also include supply of different material and non-material profits to retail traders. Thus, the concept of teamwork of alignment of sales and marketing is important.

Scientists define 4 "bases" of trade marketing: price, distribution, sales promotion, display.

Trade marketing instruments used by manufactures and distributors are divided into two groups: material and non-material.

Material instruments give the maximum profit to trade enterprise at the expense of suppliers:

- discount on goods at purchasing (the possibility to decrease price on goods at retail for a customer, to hold promotion, sale);
- bonus (discount on goods given by retailor while sales outturning over a quarter or a year);
- trade competitions (encouragement stuff, sellers on condition of increasing of sailing of concrete goods);
- encouragement for end customer (different bonuses to goods as 2 at the price of 1, 3 at the price of 2, taking part in drawing the prize on condition of performing the terms of action).

Non-material:

- merchandising of goods, offer supplier's merchandiser;
- offering POS materials to trade networks and placing them in shop's sales area;
- teaching the stuff of trade network at the expense of supplier;
- offering a consultant by a supplier who will work in sales area to sell goods straight to end customer [3].

The basic aim of trade marketing is to promote goods and to increase customers' loyalty. Any firm sets and realizes not one but many goals which are important to its functioning and development. The following goals of trade marketing have gotten the widest spread:

- to stimulate sales promotion at intermediary;
- o create competitive advantage of a supplier and certain brands;
- to improve advertising and communicative policy of an enterprise;
- to improve trading and technological processes of a firm (and an intermediary);
- to influence customers' behavior [4].

So, it is necessary to use such methods of influence customer's behavior as trade marketing for securing competitive advantages. Because the main advantages of trade marketing are the lower price comparing to TV advertising and an opportunity to quicken the duration of one overturn. In other words trade marketing assists to maximization of profit at minimization of expenses.

UDC 658

A. Vdovichenko, a third-year student,
A. Raboshuk, PhD in Acc., Ass. Prof., research advisor
Zhytomyr State Technological University

CLASSIFICATION OF CHANGE MANAGEMENT THEORIES: A CRITICAL REVIEW

The Urgency of Research. The present-day economic performance of the biggest manufacturing companies in Ukraine is under the influence of the changing society and EU integration process that can be observed. The competitiveness of the Ukrainian entities needs to be increased despite the difficulties connected with the political and social situation, otherwise, the companies are bound to go bankrupt and thousands of employees are at a high risk of losing their jobs and earnings.

The aim of the research is to take a closer look at the possible ways of introducing changes into the companies' management under the conditions of the lack of financing and work out their comparison.

Change management is a quite popular issue in the number of the scientific papers and research publications. As the famous statistician George Box said "essentially, all models are wrong, but some are useful". It is worth mentioning that organizational change management (OCM) is a structured approach in an organization for ensuring that changes are smoothly and successfully implemented, and that the lasting benefits of change are achieved.

On the basis of the study the comparative characteristics of the most famous ones has been worked out: 'Kotter's Eights Steps to Change', 'Bridge's Transition Model', 'Roger's Technology Adoption Curve', 'Prosci's ADKAR Model'.

Kotter's Eights Steps to Change. John Kotter's (1996) eight steps to transforming organizations are based upon analysis of 100 different organizations going through change. His research highlighted eight key lessons which he converted into a practical eight-step model: 1) create urgency; 2) form a powerful coalition; 3) create a vision for change; 4) communicate the vision; 5) remove obstacles; 6) create short-term wins; 7) build on the change; 8) anchor the changes into the corporate culture. Although represented by Kotter in a linear fashion, experience suggests that it is better to think of the steps as a continuous cycle to ensure that the momentum of the change is maintained.

Bridge's Transition Model – the ideas of Bridges (1991) on transition provide a good understanding of what is going on when an organizational change takes place. This three-stage model focuses on the adjustment that people make when they are going through the transition. Bridges states that "transition starts with an ending and ends with a beginning." He differentiates between change and transition, according to him change is a situational and happens without people transitioning and transition is psychological and is a three phase process where people gradually accept the details of the new situation and the changes that come with it.

Roger's Technology Adoption Curve. The technology adoption lifecycle model, based on his theory of diffusion of innovation (1962), describes the adoption or acceptance of a new product or innovation, according to the demographic and psychological characteristics of defined adopter groups. The process of adoption over time is typically illustrated as a classical normal distribution or "bell curve". The model indicates that the first group of people to use a new product is called "innovators," followed by "early adopters." Next come the early and late majority, and the last group to eventually adopt a product are called "laggards." The curve creates the foundation of 5 step process of technology adoption – Knowledge, Persuasion, Decision, Implementation, Confirmation.

Prosci's ADKAR Model. Developed in 1998 by Prosci, after research with more than 300 companies undergoing major change projects, ADKAR is a goal-oriented change management model that allows change management teams to focus their activities on specific business results. The model was initially used as a tool for determining if change management activities like communications and training were having the desired results during organizational change.

Taking into account that the most successful companies in the world represent the highest level of change management strategy, one should bear in mind that intellectual asset of such companies are the most productive and valuable. Therefore it is a change management model that should be given attention as well as any manager should do everything to make the method of changing and learning as infinite and effective process.

Conclusions. We consider ability of the company to innovate and change to be its competitive advantage. Thus, the Ukrainian companies should develop from the past-oriented, closed and passive organizations into the flexible and open to the new strategies and effective management methods.

Session work №4

MODERN RESEARCH IN THE FIELD OF HUMANITIES

UDC 81’255.2

D. Beirak, student
S. Kobzar, Senior lecturer, research/language advisor
Zhytomyr State Technological University

TRANSLATION GAP

Differences between several translations of the same text always existed and there is no doubt that it is normal. It would not be such a big problem if the translations only slightly differed in stylistics while the meaning of the original was kept remarkably adequate in both versions. Various people cannot operate with exactly the same words, but when they are able to comprehend the text equally right, a reader will only notice the subjective difference, understanding both versions identically.

The problem we want to touch is based on the contention between a good number of opinions of how to actually comprehend the gist, the details and all kinds of shades and contexts, which are put into the original text by the author, combining with the trouble of interpreting it into another language. We will examine English into Russian literary translation, but it also reflects the situation for most of Slavic languages.

To begin with, it is necessary to identify what we mean, when we use the term “movement”. As we are interested in practical side of the case, we want to classify and point at the most considerable types of translation, one most likely encounters: fully adequate, censored-adequate and inadequate. These three groups will represent several somewhat different movements and cover some sorts of ideology they follow.

Ideally, the first group—*fully adequate movement*—would have to translate an original text in a way, that covers all shades of it. This means, a fully adequate translator has not only to correctly comprehend the material and retranslate it into another language, but it has to be done deeply and sophisticatedly, keeping the intonations, attitude, irony, jokes and all the other literal devices offered by the author. More than that, all taboo part has to be translated as taboo without censorship.

This way we will have the translation that will represent the original as accurately as possible.

The second group—*censored-adequate movement*—has the same properties as the first one, but requires censoring taboos. Remarkably, back in the USSR and now in the post-USSR countries, it is unlikely to translate, for instance, swearing as swearing. Instead, it has usually been replaced with euphemisms, while everything else is translated adequately.

To clarify, as nobody can be absolutely perfect, adequate movements mentioned above can make uncritical mistakes from time to time, which will not totally affect the quality of the translation. And here where it comes to the third group—*inadequate movement*. By this term, we should consider all kinds of inappropriate translations, which are done poorly, even ignoring the fundamental basics. Those can be both censored and uncensored, but the idea is that translation is critically bad.

After defining what those movements are, we move on to the essence of the matter. As it appears, current tendency is that more and more translators try to follow the fully adequate movement. The problem here is that both professionals and amateurs do not understand one simple fact: proper translation of swearing or blind derogation from solid literariness does not automatically mean that translation is somewhat adequate. No doubt if we have a character such as a swearing teenager, a member of black neighborhood or Italian mafia, then he has to talk as he talks, up to all kinds of literal incorrectness. But there is no excuse for misinterpreted schemas or collocations, or for deceptive tone of the speech. All those errors are unspeakably common for translators of the so-called "new school". Let us ask a perfectly legitimate question. Theoretically, what is the difference between "new school" and above-mentioned fully adequate movement? The answer is — none, in theory. However, in practice, most of those "new school"-doers provide low-quality translations, and should be considered as the members of inadequate movement.

To illustrate what we mean, let us focus on one piece of work of the contemporary translator Maksim Nemtsov and his translation of the *Inherent Vice* by Thomas Pynchon. Nemtsov is known for being off-track of the classic "old school" ideology, which was used by such famous translators as Nora Gal or Aleksey Mikhalyov, just to name a few. Nevertheless, let us see the Pynchon's original (ISBN 978-0143117568) comparing to his translation (ISBN 978-5-699-65953-1).

1.

"She came along the alley and up the back steps the way she always used to. Doc hadn't seen her for over a year. Nobody had. Back then it was always sandals, bottom half of a flower-print bikini, faded *Country Joe & the Fish* T-shirt. Tonight she was all in flatland gear, hair a lot shorter than he remembered, looking just like she swore she'd never look."

"Она пришла по переулку и поднялась к чёрному ходу, как, бывало, делала всегда. Док не видел её год с лишним. Никто её не видел. Раньше

обычно ходила в сандалиях, трусиках от ситцевого бикини в цветочек, линялой футболке «Сельского Джо и Рыбы». Сегодня же вечером экипировалась, как на плоскости носят, таких коротких волос у неё он не помнил — в общем, некогда она клялась, что ни за что не будет так выглядеть”.

2.

“That you, Shasta?”

“Thinks he’s hallucinating.”

“Just the new package I guess.”

“— Шаста, это ты?

— Думает, у него галлюцинация.

— Наверно, просто новая упаковка”.

3.

“It had been dark at the beach for hours, he hadn’t been smoking much and it wasn’t headlights—but before she turned away, he could swear he saw light falling on her face, the orange light just after sunset that catches a face turned to the west, watching the ocean for someone to come in on the last wave of the day, in to shore and safety.

(…)

And least askable of all, how passionately did she really feel about old Mickey?”

“ На пляже темно уже не первый час, много Док не курил и мимо никто не проезжал — но не успела Шаста отвернуться, он бы поклялся, на лицо её упал свет, оранжевый, как сразу после заката, такой поймает, когда повернёшься к западу поглядеть на океан — кого принесёт оттуда последней волной дня, прибьёт к безопасному берегу.

(…)

Менее всего спрашивабельным было: много ли страсти питает она к старине Мики?”.

Let us comment on them. Main issues first.

In the first example, we have the translation of the proper name. It is not a strict rule, that it isn’t done, but there must be an objective reason for that, otherwise it is better to be left “as it is”. *Country Joe & the Fish* is the name of the music band. Have you ever heard anybody translating names such as *Deep Purple*, *The Beatles* or maybe *Creedence Clearwater Revival*? Apparently, never, not to mention, that *Country Joe & the Fish* never appears in the whole story to be so important as to have this word-for-word translation, just to confuse a Russian-speaking reader.

In the second case, we have the word “package”, meaning “outfit” or “garments”. In Russian, the word «упаковка» has nothing to do with «внешний вид» and «одежда»—it is what it is, the package, as a box or a container. This means that the consumer of the translation will get nothing from that, except for unnecessary discombobulation, as deep as this word’s length.

The third piece of the text shows us the incapability of the proper restructuring of an English sentence into Russian. Sure, the first one is rather long and a bit messy, but other than that, it has no errors and reads normally. The translation is barely readable at all. In the second sentence Nemtsov altogether dumbly calks the word "askable", which is a rather normal type of beyond-the-borders word formation for English, but in Russian it looks too unusual and incongruous and feels like "it's way too much".

To further perpetuate the debugging, in those examples there are the problems with the rebuilding of the word order. Even the words themselves, which for the most part are just blind copies of the English words, are strictly inappropriate for the Russian language.

From this point on, should we really consider every "new school" translation fully adequate? It declares to be that, but really, it is not, even if it generously drops F-bombs. As well as the "old school" translations sometimes have too much of the "moth-eaten literariness" in them, making dirty villains or pinheaded dopers sound like Oxford graduates.

So far, we can conclude that there is a gap, similar to the generation gap, only between approaches in translation. It is not necessarily stretched in time, but surely exists in our minds. Something lets us think, that, hopefully, the more of the linguistic products of all kinds will be produced, the sooner readers will call for a higher quality. However, it requires involving analysis and reflection, and, at last, be it as it may, the majority will definitely get what it deserves or what it will have been led to.

UDC 637.370

M. Chernysh, Master student
T. Nabuchotny, Doc in Med., Prof., research advisor
J. Beresiuk, language advisor
Zhytomyr Nursing Institute

NURSE'S ROLE IN THE WORK WITH CHILDREN OF SPECIAL SOCIAL STATUS

Introduction. Nurse's work at the medical and social institutions that are closely connected with the children of special social status demands special and active usage of efficient technologies of medical services.

The **aim** of the given paper is to present the analyses results as for defining the effective methods of the work with the children with special social status and describe them.

Results and discussion. There exist great varieties of methods that help children with special social status to assimilate into the society and nurse plays an

important role in this process. Here we propose to pay special attention on the method of "reabilitational pedagogy" that is oriented at such children. It is multifunctional. Its aim is to elaborate teaching techniques of psychological correction, play therapy, physical dysfunctions compensations and renewal of children's psychical, spiritual, moral health. Nurse's role in introducing that method into practical activity is determined and rather responsible. She is a tutor sometimes supervisor that helps children with special social status to absorb her social experience. It's worth mentioning the fact that while delivering medical care nurse also must share psychological experience and give moral support.

Conclusion. For successful adaptation and normal psychological and physical development of children with special social status special attention must be payed to combination of biological and social factors. In her work nurse successfully combine these factors. She must become one of the guides who helps introduces children into reality by means of lowing stressful situations, explaining the rules of social adaptations even to the children with behavior deviations.

UDC376.21:007

T. Gopatza, Master student
N.Shygonska, PhD in Ped., Ass. Prof., research advisor
N. Shygonska, PhD in Ped., Ass. Prof., language advisor
Zhytomyr Nursing Institute

FORMING LEADERSHIP SKILLS AT FUTURE BACHELORS OF NURSING

Social and cultural changes in the Ukrainian society determined new trends in the system of national education. The main aim of the educational system nowadays is training future specialists able to compete on equal footing with professionals on the labour market. The important place in that system is occupied by the educational institutions responsible for training medical specialists – doctors and nurses.

The objective of our paper is to present the system of forming leadership skills at future Bachelors of Nursing.

It's worth saying that medical educational programmes in Ukraine are mostly aimed at training qualified nurse, midwives and medical assistants while bachelor programme is only presented in the activity of selected institutions. Zhytomyr Nursing Institute is among them. Training Bachelors of Nursing is the innovative direction in medical vocational education that helps to integrate into the European educational system and implement its best achievements into our everyday life.

Bachelors of Nursing are those specialists who can provide administrative activity within hospitals and ambulatories. That fact determined the necessity of forming leadership skills at future Bachelors of Nursing. As the result of our research,

scientific and educational literature analyses we distinguished such acquired competences:

- Basic ideas about psychological fundamentals that promote comfortable psychological microclimate in the structural units of medical, educational or scientific-research institution;
- Basic knowledge of economics and law, understanding the cause-and-effect ties of society development and ability to use it in the professional and social activity;
- Basic knowledge of management in health care, managerial structure in health protection, administrative role of manager, managerial decisions, scientific approaches for the recruiting;
- Basic knowledge of management information securing, licensing and accreditation within the health care system;
- Basic knowledge of conflicts and stuffing;
- Basic knowledge of managerial marketing methods and mechanisms of functioning the system of health services, methodology of medical service cost calculation;
- Basic knowledge of medical insurance and its economic aspects;
- Basic knowledge of standard criteria of medical institution activity.

UDC 612.914

V. Harnitskiy, student
D. Medzatyi, PhD, Ass. Prof., research adviser
L. Petliovana, PhD, Ass. Prof., language adviser
Khmelnitsky National University

CAN A MAN BE GOD?!

Can a man be God?

The question of artificial intellect is one of the most resonant now. A lot of scientists of different directions, such as cybernetics, linguistics, psychology, philosophy, mathematics, engineering, and representatives of religion are engaged in its study. During the study of questions connected with artificial intellect, many fundamental issues, related to the ways of scientific thought, are solved. Here new methods of scientific interdisciplinary research are arisen and developed.

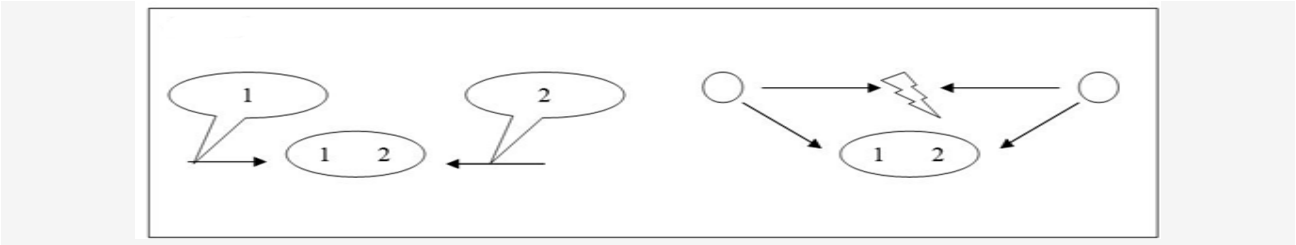
According to modern scientific data, the human brain contains a large number of "computing" nodes – neurons. The latest computer systems are rapidly approaching on its computing powe rto the brain, though it’s still far from perfection. Artificia lneural network scontrol a complex of management and tracking systems, demonstrate abilityin the field of image recognition including the possibility of creating intelligent programs in the field of medicine. In such conditions the consideration of the basic philosophical questions, related to artificial intellect and artificial life, acquires special significance. In this case, obviously, mutual influence

of artificial intellect and artificial life on the philosophical problems of thinking and life in general is possible. The concept of artificial intelligence is multifaceted. But some of the most important aspects can be distinguished.

Firstly it is the question of what artificial intellect is, because the definition determines the subject, purpose, methods, the success of the study. Artificial Intellect (AI) is better used as part of the phrase "System (s) of Artificial Intelligence" (SIC). Why is it better? Because in this case, you cannot qualify for a particular rdefinition of "intellect" (which we can find several dozen already), but simply keep in mind some artificial (made, roughly speaking, by human hands) system that simulates some aspects of human mental activity. In other words, do not determine a kind of virtual reality, but a specific thing.

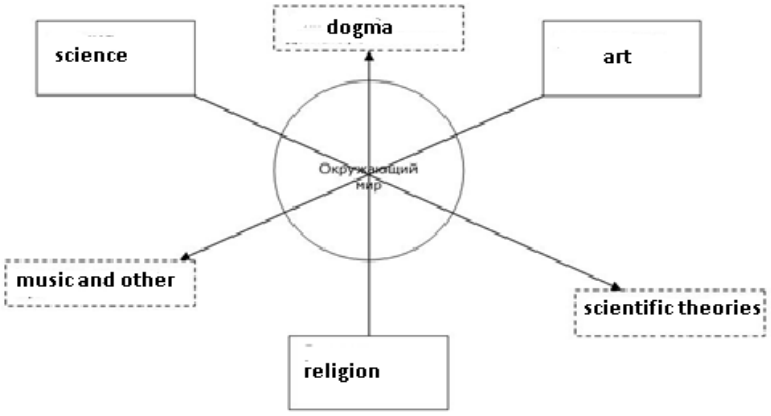
Secondly, intellect involves the processing of information, so the problem of knowledge representation in artificial intelligence systems is important. Actions that a person performs primarily based on any information in its possession. It follows from the scheme"idea -collection of information- action -result".

Third, there were and there are different approaches to solving questions related to the creation of intelligent systems, and their consideration casts light on manya spects of the problem.



On Scheme 1 we cansee that due to the fact that from two different, in this case diametrically opposite, points of view some of the observed properties of the object can be different. When a single object, there are conflicts.

Fourthly, a great importance has the ensuring interaction of artificial intellect systems with a man in a natural language, as it makes dialoguing with them much easier. Also, considering that there are 3 main ways of learning about the world, reality, namely science, artand religion, we can conclude about their relative equality.



A different meaning is put in the term "artificial intellect" – from the recognition of intelligence in ECM, solving logical or even any computing tasks, to classifying to intellectual only those systems that solve the full range of tasks implemented by a person, or even wider their combination. Describing the features of artificial intelligence, experts point to:

1) the presence of their own internal model of the external world; this model provides individuality, relatively independent system in assessing the situation, the possibility of semantic and pragmatic interpretation of requests to the system;
2) the ability to replenish the existing knowledge;
3) capacity for deductive inference, i.e. to generate information that is not explicitly contained in the system; this quality allows the system design information structure with a new semantic and practical orientation;
4) ability to operatein situations related to various aspects of fuzziness, including "understanding"natural language;
5) ability to dialogue interaction with the person;
6) ability to adapt.

Thinking, proving and disproving the possibility and necessity of the existence of artificial intelligence a man tries himself in the role of God. But do we realize our responsibility, or do we see only our capabilities? In any case, for the development of artificial intelligence for human benefit, we must take on account the moral and ethical side of the question. Are we ready to take on the responsibility that this step will assign to us and are we ready to take the consequences of our actions and opportunities?

"Human capabilities due to its physiology and biology, are finite, but artificial intelligence has no such restrictions."

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UDC 371.3

Ye. Herasymchuk, student
O. Shapovalova, lecturer, research advisor
S. Kobzar, Senior lecturer, language advisor
Zhytomyr State Technological University

IS IT POSSIBLE TO LEARN ENGLISH WITH THE HELP OF MODERN VIDEOGAMES?

Nowadays there are many ways of learning English. One of them is while playing videogames. We all have played videogames at least once in our life, maybe, with a friend, a cousin or even alone. And in many cases that videogame was in English, it also gave instructions in English to complete the game. So, to end the level of the game, first of all, we need to understand what the game is saying [3]. Many scientists say that it is possible to learn English with the help of computer games. There are many different and controversial articles and works about this issue, but we will try to prove how one can learn English with the help of modern videogames. We will show all advantages and disadvantages of this way of learning.

For our research we created a survey for the students of Zhytomyr universities to see if they have ever learned English while playing videogames. And, these are the questions with fourty answers from the students.

Survey:

- Have you ever played videogames?
  - Yes — 40 answers;
  - No — 0 answers;
- Was the videogame in English?
  - Yes — 28 answers;
  - No — 12 answers;
- What kind of videogame have you played most often?
  - Multi Massive Online Role Playing Game — 8 answers;
  - Racing game — 8 answers;
  - Shooters — 20 answers;
  - Action — 16 answers;
  - Strategy — 8 answers;
  - MOBA(ARTS) — 20 answers;

- RPG — 14 answers;
- Does the videogame have a multiplayer?
- Yes — 26 answers;
- No — 14 answers;
- Do you talk or type to other English-speaking players?
- Yes — 30 answers;
- No — 10 answers;
- Does the game require your understanding of English to finish a level or a game?
- Yes — 30 answers;
- No — 10 answers;
- Have you learned new words and meanings while playing?
- Yes — 32 answers;
- No — 8 answers.

With this information we can see that a lot of students have played videogames in English. Also they have answered that they need to know some English to finish the game, and that they have talked with other English-speaking gamers [3].

Nevertheless, most of people think that modern videogames are very violent and can't teach us anything new. So, it is true to some extent, but gaming is not just about having fun or spending our free time. Modern games are challenging, they have well-written stories and they make us think – all great things for learning [1].They also help us develop our logic, find solutions in different situations, which are proposed in the game. Moreover, videogames help us train our memory, when we try to find some information.

So, what about real videogames? Counter Strike, Grand Theft Auto, The Sims, DOTA 2, Battlefield? When playing these kinds of adventure games, it is like we are watching a movie, but we are controlling the main character. This is excellent for our English because our character is going to interact with other characters in the game, and we have to understand everything in order to be able to pass all the missions.

If that's not a good enough way to practice your English, technology has made the game playing experience even better with online games. Some online games like Counter Strike, DOTA 2 or Warcraft can be played in teams with people from all around the world.

With this technology, people are communicating with other team-mates from different countries, strategizing their attacks, working together to complete the game, and practicing a lot of English at the same time [5].

Gamers can be impatient people, always ready to start the next quest, level or chapter. This fact results in hitting ESC or clicking on the mouse button to skip a cut-scene of a dialogue between two characters to get back to the action or just clicking on 'accept' without reading the mission/quest objectives. However, when we do this, we are missing something – we miss the information that may help us understand the story of the game, we miss the information that may help us complete the next task,

we miss the chance to put our language comprehension skills to test. But if we find the dialogue in cut scenes difficult to follow, many games offer a subtitle feature these days.We can switch it on [1].

Besides, you can make notes during playing. Games can have great storylines and there might be a lot of information you need to complete a quest or move on to the next part of the game. A good way to keep track of in-game objectives is to make notes as we play. Notes can help you remember where our character should go and what he/she should do.

Moreover, keep a dictionary ready. Of course, you will not understand everything in a game, so keep a dictionary near when you are playing (this could be a traditional dictionary or an online one – whichever you prefer). Make a note of unfamiliar or difficult to understand words and try to find their meanings. This will help us with our English and help us in the game as well. Nevertheless, the more we use a dictionary the more we know. Eventually you will use a dictionary less and less [1].

And the most important part of learning English is the interaction with other gamers online. Nowadays almost all the games have online options or they are completely online (Assassin's Creed, Call of Duty, Need For Speed, World of Warcraft and many, many more). This offers a great chance to interact with people from all around the world using English as a common language. Several games offer the chance to chat with other gamers while you are playing, either by typing messages or using a microphone for voice chat. These interactions can help us complete multi-player missions in the game and they are also a great way to be social.

Other games (RPG for example) don't have any in-game chat features but they do have websites and forums where we can post messages about our game, ask for advice, offer help and interact with other players. There are hundreds of websites like this for specific game titles and for games in general. Some of them are official sites from the creators of the game and some are fan sites from the players of the game. Do a quick internet search for one of your favourite games and you will easily find these forums. Then, you can start interacting with other players. It will give you more ways to master your English skills[1].

So, modern video games is a great foundation for understanding, training and learning English. Nowadays games give us the opportunity to take English visually and aurally. It is an invisible push for our self-development.

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A. Kechedgi, A. Sherbina, S. Podoprigora, students
S. Panov, Ass. Prof., research advisor
V. Kovalchuk, language advisor
Kyiv State Maritime Akademy after
Hetman Petro Konashevich-Sahaydachniy, Kyiv

CULTURAL COMPONENTS SEAFARER

The global seafarer of today and tomorrow must exhibit the flexibility to adapt behaviors for each new cultural situation faced through knowledge and mindfulness. Increasing one's skills in these components of culture intelligence will make the seafarer more effective in the global maritime environment.

Cultural components (CC) is an aggregate, multidimensional construct, consisting of a cognitive, Metacognitive, behavioral and motivational component.

The four dimensions are qualitatively different facets of the overall capability to function and manage effectively in culturally diverse settings. It is Metacognitive CQ, Cognitive CQ, Behavioral CQ and Motivational CQ. The dimensions may or may not correlate with each other; for example, a seafarer may be knowledgeable of a culture, but may lack the ability to act upon this knowledge. Thus, cognitive CQ, metacognitive CQ, behavioral CQ and motivational CQ are different capabilities that together form overall CQ. All CC increase the effectiveness with which seafarers adapt in intercultural maritime settings.

Cognitive CQ. Seafarers high in cognitive cultural intelligence have developed a thorough understanding of the norms, practices and conventions common to different cultures through their education and personal experiences. They understand political and economic systems, institutions and cultural values and have advanced

cognitive categorization schemes through which they can recognize similarities and differences across cultures.

Metacognitive CQ.Metacognitive CQ includes the mental processes seafarers use to acquire and understand cultural knowledge, including knowledge of and control over individual thought processes relating to culture. Seamen high in metacognitive CQ have advanced information acquisition skills and are consciously aware of others cultural preferences before and during interactions. They question cultural assumptions and adjust their mental models during and after interactions. They not only understand the processes through which they can enhance their cultural understanding, but also the means through which this understanding should be applied during interactions.

Behavioral CQ.Behavioral CQ reflects the capability to exhibit appropriate verbal and non-verbal actions when interacting with people from different cultures. Seafarers high in behavioral CQ are based on their broad range of communication capabilities, such as exhibiting culturally appropriate words, tone, gestures and facial expressions. These capabilities provide the means through which cognitive and metacognitive knowledge of culture can be applied.

Motivational CQ. Motivational CQ refers to the level of attention and energy a seafarer directs toward learning about and functioning in situations characterized by cultural differences.

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P. Kobzar, Master student
T. Balabushevych, PhD in Hist., Ass. Prof., research advisor
Y. Fedoriv, PhD in Phil., Ass. Prof., language advisor
National University "Kyiv-Mohyla Academy"

DIPLOMATIC CIRCUMSTANCES OF THE LIQUIDATION OF THE REPUBLIC OF KRAKOW

Introduction

The Republic of Krakow or officially The Free, Independent, and Strictly Neutral City of Krakow with its Territory was founded by the Congress of Vienna in 1815. It was the last independent part of divided Poland. Krakow was located between three world powers of that time – Austria, Prussia, and Russia. Those countries were protectors of the small city-state and had a significant influence on it. And they finally led to its disestablishment in 1846.

Here are some definitions of main terms and proper names used in this paper. The Congress of Vienna is the conference of the big countries of Europe held in 1815 to restore a balance of power after Napoleonic Wars. The Great Emigration is Polish emigration in Western Europe formed after the November Uprising in 1830. Hotel

Lambert is a conservative camp of the Great Emigration headed by politician and diplomat Prince Adam J. Czartoryski. “Northern states” is an informal common name for Prussia and Russia and in this context also Austria.

The main idea of this work is to prove that the liquidation of the Republic of Krakow was illegal, but the international community did not react to it in an appropriate way. The significance of this study lies in the fact that the mentioned problem had never been seriously analyzed before from the point of view of diplomatic history. This paper is aimed at examination of all available documents on this topic for compliance and legality. In addition, though it is not needed for a historical research, the question of the legitimacy of annexation of an independent state territory is very topical now.

Presentation and Analysis of Data

A. Analysis of The Act of occupation of the city of Krakow and its district

This section examines the documents approving the accession of Krakow Republic to Austria. One of them was *The Act of occupation in the possession of the city of Krakow and its district*, signed by the Emperor Ferdinand of Austria on 11 November 1846. The very first striking fact about this act is the statement that Krakow was declared a free city only by tripartite agreement of Austria, Prussia, and Russia. There is no mentioning of the fact that the agreement was one of the treatises of the Congress of Vienna which were coordinated with all European states. So it is argued that the agreement was legitimately broken of the will of all three parties who entered into it.

As the reason for liquidation of the Krakow Republic was called violation of the constituent agreements. It is alleged that an obligatory condition of independence of Krakow was the issuance of any fugitives who were the subjects of protector countries. Instead, the city had become since the November Uprising, “a hotbed of intrigues against three patron states” [3, p. 462].

Uprising of 1846 surpassed all previous riots because revolutionary government was established in Krakow, self-proclaimed in defiance of the constitution of the republic. It urged all residents of the former Polish lands not to obey legal authorities, and its armed forces have attacked neighbouring states. Therefore, in order to ensure their own safety, three courts decided to return Krakow and its provinces to Austria as it used to be before Napoleon.

B. Analysis of The Announcement of the accession of Krakow to Austria.

In more details formal motives of “northern states” are described in *The Announcement of the accession of Austria to Krakow* from November 16. This day is considered the final end of the Krakow Republic. The document explains that since Krakow became the organizational centre of armed revolt that included also Grand Duchy of Poznań as well as Galicia, it thus found himself in a warlike situation with Austria, Prussia, and Russia. So those states had every right to act according to the laws of war.

At the same time, it is alleged that they had no intention to take revenge or to act by the right of the stronger, but only wanted to bring peace and security to their subjects, who were threatened by Krakow's unrest. It is said that Krakow for already twenty years had been a source of troubles and disturbance. And its recent actions that openly contradicted the neutral status finally destroyed the basis of its existence.

The protector states are portrayed as benefactors who repeatedly sought to support and help the Krakow Republic and were very moderate in conflict situations. However, "Krakow as a political body proved to be too weak to resist the constant disturbances of Polish emigrants who keep this free city in the moral yoke" [3, p. 467].

It is important that this document has a reference to the treatises of Vienna, however, it is declared that the agreement between Austria, Prussia, and Russia were included to them only in order to bring them into the international circulation. Therefore, it was decided to break bilateral agreements between Austria and Russia and between Russia and Prussia, as well as additional tripartite treatise on Krakow.

Discussion

A. Diplomatic reaction of Great Britain on annexation of Krakow

So, on the 16-th of November 1846 Krakow with its district was annexed to the Austrian Empire, which instead gave up some parts of Galicia in favour of Prussia and Russia. Democratic circles of the whole Europe condemned these acts which destroyed the last piece of once great Rzeczpospolita. Special arrogance of this act was that the tiny republic, sandwiched between three powerful states, was not creating for them any serious threat and simply had no chance to fight off the aggression. But the most important was that Vienna treatises were openly violated by those who supported their signing in that form the most and those who voluntarily pledged to preserve the independence and neutrality of Krakow [1, p. 397-398].

But Paris and London at that time had no desire to unite in order to ensure fulfillment of resolutions of the congress. Only a week after the annexation of Krakow, Palmerston sent the letter of protest to Vienna. However, it implied that London has no intention to take any serious measures to protect the offended country. In this dispatch he pretended that he considered joining Krakow only a project but not an accomplished fact and urged Austria to abandon their "plans". He explained that such a small state would not be dangerous to empires and called to listen to the authority of the signatories of Vienna treatise.

Then in early December, Lord Palmerston sent a brief instruction to the British diplomatic mission in Vienna. In it he gave an order to convince the Austrian government that the cancellation of Krakow's independence is not only unjustified step that violates the Vienna treatises, but it is also harmful for European trade, particularly for British commercial interests [3, p. 475].

B. Diplomatic reaction of France on annexation of Krakow

French Foreign Minister François Guizot did not wanted to conflict with Austria. But under the influence of public opinion at the end of November he

appealed to Lord Palmerston with a proposal together to make a diplomatic note on violence against Krakow. But his colleague refused, arguing that Great Britain has announced their protest before.

François Guizot in his protest, sent to Vienna on 3 December, expressed himself much more seriously, using strong arguments against the liquidation of the Free City of Krakow. French minister wrote that if the main reason for dissatisfaction of neighbouring states were armed riots, so they should be aware that the destruction of the republic would not lead to their decline. He claimed that parts of the old divided Poland rebel, because of injustices inflicted on its people. So to calm the Poles they should use soft and fair policies and stick to their promises. A free city elimination can only increase revolutionary sentiments that would threaten the entire European order.

Guizot argues that protector states were able to force Krakow to fulfill its duty of extraditing the fugitives without the destruction of the republic. It is enough to consider that free city sandwiched between the three great powers, which also still had some patronage rights. So they could solve the problem without resorting to extreme measures, "which while eliminating some of the risks, are often creating new, more threatening ones" [3, p. 472].

He emphasizes that in any case any important decisions regarding Krakow should have been resolved with the participation of all countries that took part in the Congress of Vienna. Guizot denies the idea that The Additional treatise was signed between the three countries and was included into Congress resolutions only for information. Due to the European law independent states are not required to register their agreements anywhere as well as to sign someone else's. Also the Polish question was one of the key at the Congress of Vienna: the first five articles of the General Treaty are about the dividing of Polish lands, next four – specifically concern the Free City of Krakow, and the tenth equates the power of Additional treatise on Krakow to the General one.

Finally, François Guizot is protesting against the violation of resolutions of the Congress of Vienna, which were the guarantee of peace in Europe, and the negative precedent was untying hands for all. At the same time, the decisions of 1815 were mostly unfavourable for France, but it executed them faithfully for the common good. So should "Northern states" which got the most good of them.

So it can be seen that both France and Great Britain, though expressed their indignation, but in reality had no intention to threaten Russia and Austria and defend free Krakow. And Antonin Debidour notes that Klemens von Metternich, Austrian minister of foreign affairs, understood this very well but had to write another note to report the unconvincing motives of his government once more just for politeness [1, p. 399].

Conclusion

We have analyzed the documents relating to the final disestablishment of the Republic of Krakow and have identified the essence of the arguments of the Austrian

Empire and diplomatic reaction of France and Great Britain. The formal reason for the liquidation of a free city was violation of the conditions for extradition of refugees from neighbouring countries. Also they claimed that the Additional Treaty and agreements between Austria, Prussia, and Russia were just the decisions of the three countries, not the whole Congress of Vienna, and so they had the right to terminate these agreements by the common decision.

Europe reacted to this undisguised violation of the international order only with diplomatic notes. Even though some of those memorandums were very determined, they made it clear that nobody was going to take serious measures to protect Krakow.

That findings show that the so called "right of the strongest" had a great impact on international relations and diplomacy. And that should be taken into account when analyzing historical and contemporary events. So this research can give historians and political analysts a better understanding of the reality of international affairs and correlation between the power of law and the power of strength.

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H. Kuznetsova, Master student
V. Shatylo, DSc in Med., Prof., research advisor
N. Shygonska, PhD., Ass. Prof., language advisor
Zhytomyr Nursing Institute

CURRENT APPROACHES TO IMPROVING THE QUALITY WORK OF MEDICAL PERSONNEL OBSTETRICS AND GYNECOLOGY DEPARTMENT

Women's health is the nation's health. Therefore, medical institutions of Ukraine, performing medical and preventive care for gynecological patients, have a responsible mission: reducing and prevention of gynecological morbidity.

This mission is even more difficult, as now we can find more and more risk factors that cause diseases in women. This includes migration of population, urbanization, changes in sexual behavior of young people such as: an early start sex life, irresponsible attitude of some young women to marriage and fidelity. All this threatens the reproductive function of women, and therefore affects the demographics and is essential for the country as a whole.

The aim — justification ways to improve the quality of care to the female population.

Materials and discussion

Nursing as a profession is based on educational standards, certain knowledge base, professional standards and the code of ethics. The main characteristic of profession is acquiring special theoretical knowledge, practical skills, professional skills and their application in the work [1, p. 3-4].

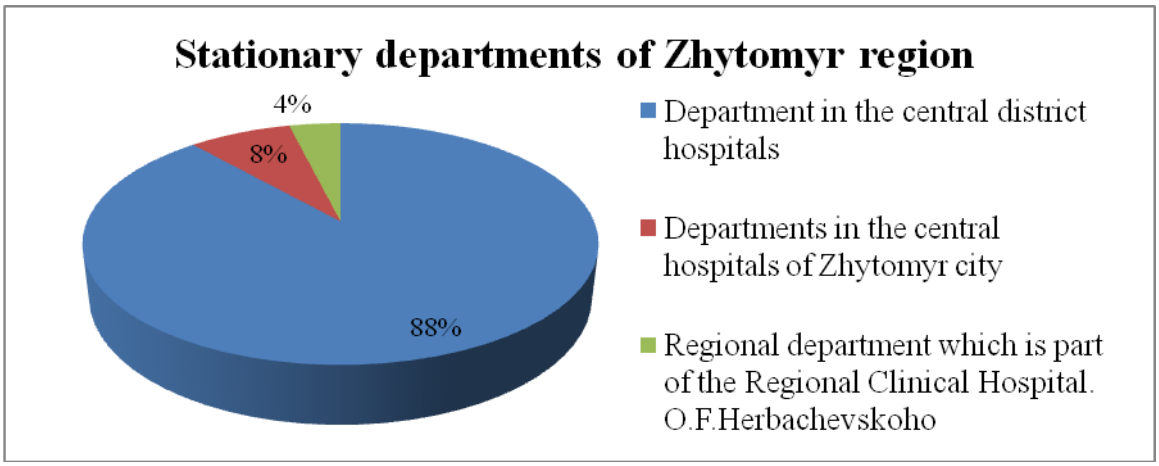
According to WHO for 2012, are 35.2 doctors per 10 thousand population and 85.9 nurses and midwives per 10 thousand population working in the medical service of Ukraine [2].

Organization gynecological care in Ukraine based on the regulations of the Ministry of Health, which regulate the activity of gynecological departments, their staffing for appropriate equipment, indications for hospitalization, etc.

Gynecological service of region is working for preserving reproductive function of women.

According to data for 2012 in Zhytomyr region has 23 gynecological departments in the central district hospitals, 2 departments in the central hospitals of Zhytomyr city and one regional department which is part of the Regional Clinical Hospital. O. F. Herbachevskoho.

Ukrainian women can get health care at 456 gynecological beds, representing 6.55 per 10 thousand female population (Ukraine - 8.37). Employment gynecological beds in 2012 was 321.6 days (Ukraine - 325.6 days). The average length of stay of patients on gynecological bed - 8,74 (Ukraine - 8.66) [3, c 8-9].



Pic. 1. Gynecological departments of Zhytomyr region.

To achieve the goals of our research we have conducted analysis of obstetric and gynecological morbidity and help for the past 5 years and medico-sociological survey of practicing midwives and nurses of gynecological departments.

Analysis of the first registered disease in women of childbearing age Zhytomyr region (2010-2013) indicates the negative trends in their health status, as well as increasing disorder of the female reproductive system.

During the medical and sociological research found heavy loads on the medical staff, the inability to pass obstetric specialization. The system of professional development need improvement.

Nowadays the rise in living standards and the level of medicine require new approaches to health care provision and creation of a highly qualified specialist with a high level of experience, knowledge of law, creativity and general culture. Specialist who is able not only to carry out doctor's prescriptions and provide patients with care, but also to use an individual approach, to work with relatives of patients and carry out research work on the problems of nursing.

Conclusions

To improve the quality of nursing care in gynecologic departments and improve the professional skills of health workers middle managers are invited to: 1) introduce specialization courses before taking a job in a specialized department for medical staff middle managers; 2) expand the training program for nurses to diploma and postgraduate stages of training; 3) introduce a specialized bachelor for midwives.

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N. Lazorko, student
T. Yelnikova, PhD., Ass. Prof., research advisor
S. Kobzar, Senior lecturer, language advisor
Zhytomyr State Technological University

RESEARCHING OF WATER AND ITS PROPERTIES

The problem of water is very topical nowadays. We often don’t ponder about effects of our actions. We think that our nature resources are unlimited but we are wrong. The information for 2011 informed, that there will be enough fresh water only for ten years. Every year we use 64 million cubic meters more water, and by 2050 nearly 10 billion people will live on the Earth. So we now have to start saving to extend this period [1]. Essentially, the water has a lot of secrets.

Water is a substance, without which there can be no living creature on the planet. Till nowadays it was thought that water properties depend on the chemical composition. So it was divided into living and dead (V. Kaznacheev). But that is not the only secret. American professor Rustum Roy describes the situation which took place in the sixties in Germany. A laboratory assistant accidentally dropped vessel sealed vial of poison in the water. She was scared and to hide her mistake, she just threw the flask aside. Three days later, the vial was taken out and the water was given to laboratory rats. Later they were found dead. Here is a question – Why? The water was absolutely clean and did not touch poison. It turned out that the water absorbed all the negative energy from the ampoule, thereby adopted its properties.

Water is a structure that can store the information. It remembers everything that happens to it, any changes, touch or waves [2]. So water has a whole range of frequencies, it is very sensitive to the environment, it constantly changes its structure. Leonardo Davinchi said: “Water takes a special character as many times as there are places where it flows”.

If we talk about the benefits of water, its value, it is necessary to mention that a human consists of water on four-fifths. With the loss of two per cent we feel thirsty, ten per cent – we have hallucinations, and more than twelve per cent – we die.

A Russian doctor of health recovery institute argues that it is also very important what kind of water we drink. For example, in the city Okinawa (Japan) people do not have enough oxygen and food, but their middle lifetime is one hundred years old. The reason is the water they drink. It is extremely clean, full of sun’s energy and free flowing [3]. And let’s look at our water from the tap. It flows in pipes with sharp turns devoid of light and oxygen, absorbs the traffic noise, all evil, hate and displeasure of people on its way. So when we pour it, the water is very weak and we should defend it during the day.

So, as a result water is staying full of secrets and mysteries. And the problem of water will be actual all the time we use it.

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D. Logvin, R. Savosta, D. Chernomor, students
S. Panov, Ass. Prof., research advisor
V. Kovalchuk, language advisor
Kyiv State Maritime Akademy After
Hetman Petro Konashevich-Sahaydachniy

COMMUNICATION SEAFARER ON BOARD

The general question addressed in this study is concerned with the perception of students of Kyiv state maritime academyregarding the introduction of the "Maritime English Proficiency" course.

This study attempts to answer the following research question: Can a course on multicultural issues increase the sea farers competence?

The study was conducted at the English language Department in Kyiv state maritime academy. The participants in the study were one hundred students who had performed their on board training in multicultural crews. First, we explained to the students the intended goal. After explaining to them the tasks they would be required to perform, we assured them that confidentiality would be maintained. Each student was then given a questionnaire consisting of ten questions. The time allotted to answers was one hour.

The questions included in the questionnaire were the following:

1. What nationality did you have to work with at sea?
2. Have you come across any communication barriers?
3. Can these communication barriers be put down to the linguistic aspect of maritime English in particular?
4. Can you give examples?
5. Apart from language barriers, have you faced any other difficulties due to cultural diversity
6. Did you feel in your shoes working in a multicultural environment?
7. If not, what sort of problems did you meet with?
8. Do seafarers need to know the culture of others while working in a multicultural environment?;
9. Do you think that there should be a course on communication skills and cultural awareness within Constanta Maritime University? Why? Why not?
10. Do you think a course on Intercultural Communication will be useful to improve the safety and the working environment on board? Why? Why not?
11. Should this course be taken by ratings as well?
12. What relevant topics should be included in the Intercultural Communication course?

The outcome of the present survey is presented below.

This section will deal with the participants' responses to the questionnaire. From the responses to the first question we made up a list of nationalities that Ukrainian seafarers had to interact with. The proportion of the nationalities was the following: British (6%), French (3%), Italians (4%), Chinese (3%), Japanese (3%), Russian (3%), Ukrainians (4%), Filipino (18%), Sudanese (2%), Bulgarians (4%), Polish (6%), Greeks (3%), Egyptians (4%), Croatians (4%), Indonesians (9%), Portuguese (4%), Indians (7%), Norwegians (6%), Swedish (3%), Dutch (4%), etc.

A seafarer must be trained to demonstrate his ability to communicate effectively and to exchange information accurately. With a view to this, the maritime lecturers have to find the best way to describe how intercultural communication should be taught. The compilation of such a course is meant not only to educate students, but also strengthen their ability to study and comprehend the foreigners' heritage background.

Developing cultural intelligence takes time and experience to truly become confident that one can respond authentically in words and actions to different cultural situations. Understanding the nature of cultural intelligence, diagnosing one's cultural intelligence level and proactively developing a higher level of cultural intelligence can position a seafarer to succeed in a globalized maritime environment and support a shipping company's overall business goals. The importance of the course on "Maritime English Proficiency» reveals its vitality as part of merchant marine students' curricular content.

UDC 327

I. Shcherban, Master student
L. Pavlenko, PhD, Ass.Prof, research/language advisor
National University of "Kyiv – Mohyla Academy"

THE IMPORTANCE OF COOPERATION WITH THE V4 COUNTRIES

The changes that have recently taken place in Ukraine have kindled hopes for a new country and a new state to guarantee that rights of every Ukrainian, no matter from which walk of life, will be protected. Unfortunately, Russia, which had always intruded when the cause of liberty could gain the upper hand, has got entangled this time as well, retaliating by annexing Ukraine's Crimean peninsula and pulling the strings of "spontaneous" revolts in the East of Ukraine. Certainly, Ukraine has never been in such a desperate need of an ally as today; the Visegrad Group, Ukraine's neighbors, might fill the shoes. This is especially true if one takes into account the statement by Milos Zeman, the president of the Czech Republic, who said that Ukraine was among the three counties welcomed in the V4, right after Slovenia and Austria. As a matter of fact, Ukraine will be more successful in promoting its interests, should it side with the countries of the Visegrad Group.

The Visegrad Group, or the V4, is an alliance of four Central European states: Poland, the Czech Republic, Hungary and Slovakia, designed to facilitate cooperation in political, economic, and military spheres. In the sphere of politics, the reason for the Group's emerging was advancing the countries' European integration. Presently, all of the countries are the EU members, and have been since 2004. Energy issues are of primary importance to the four countries as long as economic cooperation is concerned. The V4 countries are working jointly on reducing their dependence on Russian gas. Additionally, they tend to be pro-nuclear energy lobbyists within the EU claiming that Europe should reconsider its nuclear energy policy. The V4 military cooperation began with the Visegrad Battlegroup initiative on the part of Poland offered in 2011. The group is expected to become operational in 2016, Steadfast Jazz NATO exercise having been a great contribution to shaping of liaisons between the countries' armed forces. Thus, the V4 stands for the Visegrad Group, a political, economic, and to some degree military organization.

Historical experience is the first point on the list of similarities between the countries. The first issue that all of them share is that their territories were incorporated by other kingdoms in the past. That could happen of their rulers' accord and peacefully, as it did in 1350's, when Rus' lands, which constitute today's Ukraine, were incorporated into the Grand Duchy of Lithuania. Incorporation was accompanied by no hostilities when Slovak lands became part of the Kingdom of Hungary in the 10th century; when King Sigismund of Hungary succeeded to the throne of the Kingdom of Bohemia (Czech lands) in 1419, or when Hungary itself was incorporated into the Habsburg monarchy (which would later be known as Austria) in 1526. It could also be accompanied with armed resistance, as it happened during the partitions of Poland on the part of Prussia, Russia and Austria in 1772, 1793 and 1795. Another issue that all the five countries have in common is belonging to the old Austrian Empire. Admittedly, it is not as vivid with Poland, for Austrian rule extended only to Krakow and Lublin and the adjoining territories. The same rule applies to Ukraine, only four big cities of which were part of Austria: Lviv (Lemberg), Ivano-Frankivs'k (Stanislau), Ternopil (Tarnopol) and Chernivtsy (Czernovitz). However, one may still claim that all countries thus have a common past. It is twice as essential given the fact that all territories of an empire belong to one "imperial context" which provides "horizontal interactions between different elements" [2, p. 44– 45]. The last mutual feature of the five countries is that they all later found themselves in the Soviet orbit. In the case of Ukraine that was in 1921, the country becoming one of the core elements of the USSR, while the other four were trapped in the Soviet "sphere of interest" right after WWII. Consequently, the histories of the V4 countries and Ukraine have so much in common that one would be justified in saying that they have similar historical experience.

Another issue that could serve as a rallying point for the countries is energy policy. First, all V4 countries and Ukraine are vulnerable to pressure on the part of Russia as long as they are dependent on gas import from that country. Not only is

Central Europe dependent, but is also likely to find itself isolated, for Russia is has recently undertaken construction of a new gas pipeline, the Nord Stream, to transport the resource directly to Germany, giving the CE (Central Europe) countries a wide birth. Definitely, this will enable Russia to dictate whatever rules it deems necessary to the V4 countries; cutting off gas supply to the CE will no longer entail a stop in its transportation to Germany and France. As Edward Lucas, a pundit with a profound experience of work in the region pointed out, this is negotiating over the head of the Central Europe [6, p. 473]. Taking into account the latest events in Ukraine, the V4 cooperation might gain our country leverage in its struggle for less energy dependence; a collective policy of five countries is likely to make Russia think twice before exercising pressure. Besides, energy cooperation is already in progress: reverse gas flows from Slovakia and Hungary to Ukraine are already underway [3; 7], and "There's the will to do it of both governments, support (also financial) from the European Commission, and the immediate need" [1]. Second, the Visegrad Group countries and Ukraine possess a vested interest in diversification of natural gas import. Presently, one of the solutions is import of LNG (liquefied natural gas) from the United States. Ambassadors of the V4 countries have already addressed the Speaker of the United States House of Representatives to eliminate bureaucratic restrictions prohibiting export of American natural gas to non-FTA (free-trade agreement) countries [5]. As long as Ukraine is concerned, the U.S. Senate and House of Representatives committees have included Ukraine on the list of prospective purchasers of the LNG, should the shipment begin (which cannot begin until 2016) [8]. Since the prospective gas delivery to Europe has already been subjected to criticism by some of American companies, Ukraine's siding with the V4 might improve the likelihood of a positive decision. Third, Ukraine's V4 integration will lead to technological advancement in the sphere of nuclear energy. The sphere has managed to survive and progress in the Central Europe, despite Berlin's and Vienna's pressure [9]. The Visegrad Group appears to be a perfect partner for Ukraine, which is not going to renounce its energy production. Likewise, Ukraine could contribute to technological development and imposing more severe safety measures on nuclear power plants. Hence, Ukraine's energy interests are in absolute accord with those of the V4, and thus could be a serious reason for advanced cooperation.

The last sphere that is certain to help the five countries find common ground is security policy. One argument to be employed to defend this assumption is that all the relevant countries border each other. Ukraine, for instance, has common border with all countries save for the Czech Republic. Another point to be used in the reasoning is that according to the project of the Visegrad Battle Group drafted in 2007, Ukraine is supposed to be a participant. Moreover, the V4 signed a pact on a joint military body "in response to the escalating Ukrainian crisis" last year [4]. Given the fact that the negotiations on the pact have been stumbling for years, one might logically conclude that Ukraine's security is considered crucial to that of the V4. The last argument to be

used to buttress the claim of a mutually beneficial military cooperation is that of alignment. So far, Ukraine is the only country in the region, save for Moldova, positioned without any military block. Ukraine is neither a member of NATO, nor of the CSTO (Collective Security Treaty Organization). Taking into account the fact Ukraine's becoming a NATO member in the nearest future is extremely unlikely, being a part of the V4 will undoubtedly present its advantages. Consequently, Ukraine's prospective military cooperation with the Visegrad Group is essential to maintaining security of Ukraine and Central Europe.

To conclude, one should state that Ukraine's V4 cooperation is important, since it shares common past with the countries, has common vested energy interests, and has substantial prospects of military cooperation. While shared historical experience is by all means of great importance, common energy interests would usher Ukraine into an alliance that would provide Ukraine with an excellent bargaining position. Military cooperation is also of great essence, since the V4 membership is likely to work as a scarecrow against a potential aggressor, even though the chances of someone's intervening on behalf of Ukraine will remain slim. Still, belonging to the V4 will undoubtedly enhance Ukraine's international stand in relations with any other political body, be it single state or an alliance.

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I. Strelchenko, student
S. Kobzar, Senior lecturer, research advisor/language advisor
Zhytomyr State Technological University

HOW TO OVERCOME STRESS IN OUR DAILY LIFE

There's a lot going on in this world. In fact, there's probably a lot going on in everybody's life at the moment. So much work to do for so little period of time. Each day we face many different hardships, and as we work through our problems we need to fight through stress, anxiety, fear, anger, frustration, overwhelm and a plethora of other emotions. These emotions leave us in a frantic state, which negatively affects our health and hurts our ability to make right decisions.

What are the main reasons for stress and frustration in our life? A freelance writer Alexia Severson [1] specifies seven unnecessary causes of stress and depression. She says that replaying stressful situations in our mind over and over again makes us relive the stress we have already experienced. Furthermore, one of the form of dwelling on the past is worrying about the money we have already spent. "You can't unspent the money," Gruver says. On the other hand, many people feel stressed out because of worst-cause-scenario thinking. Gruver underlines: "Focusing on the possible negative outcome of a situation only projects negative thoughts into the future". However, the main reason for stress and frustration in the life of a student is procrastination. Everyone procrastinates for different reasons, but in many cases, people put things off because they feel overwhelmed by or scared of what they need to do. Moreover, it is no wonder that even a messy room or a cluttered office or any other type of clutter in our life can make us feel stressed. Finally, "When you're over lurking on social media, you're comparing yourself to others, which causes stress", says Stephanie Mansour. We are grading our self-worth and self-esteem based on what we see from other people, not on our own benchmarks for success and happiness.

What should we do to overcome stress and depression? Larry Lewis in his article "Staying Calm in Difficult Circumstances" [3] tells us about his method of calmness. Firstly, we should identify the stress. Reflect for about 10 seconds, hold on to our reactions, and think what it is that's really bothering us. Secondly, we should choose our response and remember we cannot change the situation, but we always can change our bad response to it. Here are some questions we can ask ourselves: Does it matter? Am I overreacting? Will my reactions create the best result for me? Is this actually important? Thirdly, we have to make the right action, meet the source of our stress head-on; but only when we are ready, having taken time to think things through.

Steven Kuh in his work "10 Tricks Successful People Use to Stay Calm in Stressful Situations" [2] argues that remaining positive, looking at obstacles as

opportunities to learn and at tough assignments as chances to show the world (and especially your boss) what you are made of, can make you feel more comfortable and calm in difficult circumstances. He also specifies one tactic successful people use. It is back-casting, where they think about the final objective they are working towards and identify each step they need to make on the way to achieving it. In other words, they make their own plan to achieve their life goals.

Overall, in this life everyone has plenty stressful situations and it is important to know how to cope with them. We believe that our own decisions cause most of the frustration and stress in our lives. Procrastinating, negative attitude, worrying about money, worst-cause-scenario thinking are the actions that lead us to stress and depression. So, if we want to decrease the amount of stress in our life, we need to start making right decisions today.

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I. Tarasiuk, Master student
V. Svyrydiuk, Doc in Med., Prof., research advisor
J. Beresiuk, language advisor
Zhytomyr Nursing Institute

BIOSOCIAL AND SPIRITUAL DETERMINANTS OF MENTAL HEALTH

Introduction.

Mental, somatic and social well beings are the important units of everyday life for every person. They are in their turn closely interconnected. Mental disorders make five from ten reasons of disability in the world. The WHO experts note that in the future the number of such category patients will grow sufficiently.

The **objective** of the paper is to maintain the regional peculiarities of peoples' mental diseases in Zhytomyr district.

The main data sources of the research are statistical data and authentic questionnaire that was proposed to 206 respondents. In the basis of the questionnaire lay the PARI method (parental attitude research instrument) of E.Sheffer and R. Bell.

Results and discussion.

Europe today faces big problem connected with the increasing number of patients suffering from mental disorders. In its turn it leads to considerable growth of suicide rate – from 2 to 44 on 100 thousands of population. In Ukraine 1,2 million people require psychiatric help. Upward 1991 the number of mental disorders grew in 1,2 which makes from 22,2 to 26,6 cases to 10 thousands of population. In 2014 69,0% from all registered cases were patients with mental disorders of active working age, 23,0% - children. Attempted suicides in 2014 made 22,5 cases to 100 thousands of population (18,8 in urban territories and 30,5 in rural ones).

Among the determinants of mental health we can distinguish the number of biosocial factors, such as: heredity, sex, poverty, unemployment, social and home conflicts, wars, natural disasters, somatic illnesses that are accompanied by stigmatization and discrimination (HIF/AIDS, Kaposi's sarcoma, tuberculosis), somatic and psychical traumas' consequences especially at military men. 90% from them can be hereditary. Emotionally stressful satiations in the majority of cases family conflicts initiate transference into active and then chronic illness form.

Especially important as the stressors are family conflicts. Nowadays family conflicts are equivocal. They are considered to be the compulsory component of family life not as the negative factor including happy unions - 80–85% families have conflicts but conflicts differ in their essence. It concerns happy and unhappy unions. In the first ones they are not numerous, long and usually help to solve the problem. For the unhappy ones conflicts are typical and lead to divorce. Divorce is the destructive way of solving the family conflict that cannot be compared with suicide, murder of the family member. Family conflicts are preliminary to divorces: frustration with family relations (half men and one third of women), excessive finicky for the partner (one third of women), addiction for conflicts (one third of men and women), exaggeration of own authority and partner's undervaluation, starving for domination in the family instead of equality in relations, destructive behavioral models (two thirds of men and over half of women).

General prevalence of mental diseases is common both for men and women. But generalized anxiety disorders and neurotic depressions are widely spread at women while disorders connected with abuse of antidepressants and antisocial personal disorders are mostly peculiar to men.

Social factors also play an important role in gender diversity and anxiety disorders. The traditional role of the women as the domestic goddess involves them into considerable stress and gives less possibility for elimination of stress determining

atmosphere. Another reason of sex connected differences in frequency of mental disorders is wide extension of sexual transactions and family abuse that commonly concern women. Every fifth woman is raped or attempted to rape but men frequently commit suicides that deal with family conflicts.

Conclusion.

Nowadays the population of Zhytomyr district has the variety of diseases among which mental disorders have considerable significance. Family heritage, stressful situations initiate family conflicts that afterwards result divorces and suicide.

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S. Voloshyna, Bachelor student
Ye. Dolynsky, PhD in Psychology, Ass. Prof., research advisor
L. Petliovana, PhD in Phil., Ass. Prof., language advisor
Khmelnytsky National University

THE PROBLEM OF REALIA SEMANTIC AND STYLISTIC FEATURES RENDERING IN MODERN TRANSLATOLOGY

The aim of this work is to consider different approaches to the definition of realia and analyze methods of realia translation that cause difficulties while rendering it into foreign language.

Realia as a translation category have been studied insufficiently. This fact does not allow forming an unambiguous interpretation and definition of realia. Its linguistic nature has not been considered enough. There are no clear criteria for identification.

The term realia is Latin for "real things" and in translation studies is used to refer to concepts which are found in a given source culture but not in a given target culture [6, p. 126].

The term "realia" was first introduced by A. Fedorov in 1941 to describe a national specific object. The realia origination does not depend on our tastes,it is caused by public necessity and extralinguistic factors.

According to R. Zorivchak, not only words and phrases can be referred to realia at the speech level but also phraseological units which are regarded as historical, ethnographic or everyday realia in accordance to its semantics [2]. Some researchers (K. Shahova, A. Bakanov) refer toponyms and anthroponyms to realia. They are actually right because these words support the creation of national flavor and history. Realia contain the so-called background information which causes great difficulties while translating them into another language. First and foremost we speak about realia of social and everyday life and proper names [4].

Rendering in translation of phenomena inherent only to another culture and unusual (or even unknown) to target linguistic-cultural community is considered in translatology as translation of culture-specific vocabulary or translation of realia. R.

Zorivchak lays the stress on the fact that these words are found only while language comparison: "Realia are a variable category related mainly to the process of a binary comparison of languages at lexical and phraseological levels" [2, p. 49]. S. Vlahov and C. Florin note that realia differ in the nature of their subject matter, i.e. close relationship of denotatum (marked with objects, concepts, phenomena) with the people (country), tribe or at least a social community on the one side and the historical time period on the other that forms appropriate national (local) and / or historical flavor [5, 123]. These researchers define realia as "words (and phrases) that name objects available in life (mode of life, culture, social and historical development) of one nation and alien in another's and they usually do not have accurate matches (equivalents) in other languages, and therefore cannot be translated "on a general basis" because of requiring a special method [1, p. 47].

Significant progress in realia study in Ukrainian translatology is made in V.Koptilov's works. In the definition of realia scientist focuses primarily on cross-language comparison factor. Thus in his book "Current Issues of Ukrainian literary translation" V.Koptilov defines realia as "words denoting objects and phenomena unknown in target language."

V. Koptilov shows that different historical periods deal with reproduction of unrenderable in different ways - from complete replacement of unfamiliar realia by known one among native speakers - to preserving in translation all national peculiarities. According to scientist modern translatology needs "dialectical combination of native and alien" which "corresponds to the very essence ofliterary translation and as result of which a foreign author meets Ukrainian reader" [3, p. 38 - 39].

Based on J.Retsker's work "About natural equivalents in the translation in native language" (1950) and his grounding of the concept of "equivalency" as well as the existence in a multilingual words semantic structure of meanings which do not coincide, H. Shatkov introduces the concept of "culture-specific words." According to his definition, "culture-specific words are lexical units of a language that at a certain historical period do not have ready equivalents in another language vocabulary." H.Shatkov refers realia, separate words, some phrases to culture-specific vocabulary. He introduces formal translation criterion into his definition of realia: the factor of presence / absence of an equivalent vocabulary counterpart in two contrastive languages. This criterion does not indicate any substantial qualities of realia words and transfers the possibility of its identification in the scope of interlanguage counterparts.

In case of realia we should talk not about translation itself but only about finding semantic and stylistic equivalent or translational realia renomination.

In the beginning of Ukrainian fictional works adoption by English literature the translation of realia with the help of transcription (transliteration) dominated. In modern translatology the problem of realia semantic and stylistic features rendering in translation acquired pivotal importance. Many researchers considered the issue and

often came with different conclusions. Also, when translating realia it is necessary to consider the fact that different languages define different ways of realia translation.

Based on a comparison of English translations of Ukrainian prose with their originals one can distinguish following methods of translational realia renomination: *transcription, hyperonimic renaming, descriptive paraphrase, combined renomination, word-for-word translation, interlingual transposition in the connotative level, the method of assimilation, contextual interpretation of realia.*

The term "**transcription**" denotes finding the most accurate equivalent by means of recording of words sounding in source language by graphemes of target language. Transcription related to accurate (as possible) rendering of foreign words sounding (primacy of pronunciation) is not the only way of translation. Graphics primacy is also possible (method of transliteration). For example: *"характерник" ("чаклун", "чарівник")* - *kharakternick*. The only type of realia which must save its national peculiarities while tranlation is anthroponomyms and toponyms such as Ukrainian *Тарас, Ярема, Калина, Вірко, Черемош, Назар.*

Hyperonimic renaming is a rather common realia translation type related to main concepts of lexical transformations, denotatum ranking, recognition of part and a whole isomorphism, generalization. The possibility of such type of translational renomination, of such deconcretization is connected with the presence of interlingual hyponyms which in their turn are caused by hyponym as language universal. Hyperonimic translation conveys the semantics of the so-called denotative realia with the loss of "locality" seme and some semantic-differential features. This is how M. Kotsyubynsky describes the main character Malanka in the story "Fata Morgana": *"Мала, суха, чорна, у чистій сорочці, в старенькій свитці"*. A.Bernhard's translation: *"There was Malanka, small and thin, in a clean blouse and an old coat* ". Hyperonic renaming *свитка – a coat*is not adequate: *a coat* has neutral meaning and *свитка*, in addition to general denotative meaning *"clothes "*, means *«clothes made of rough homespun cloth."* As for the connotative semantics the word "свитка" has also implicit meaning of *"poor man's clothes"* and it contains a local seme denoting ethnic relatedness and means *"Ukrainian peasant's clothes."*

When a high degree of explicitness is required in the translation process, descriptive periphrase is commonly used and promoted by context-situational factors. Periphrase can be briefly described as descriptive phrase with the help of which the phenomenon, object, person are called not directly but in descriptive way pointing out its peculiar features. Here are some examples of successful periphrase: *свячений - a consecrated dagger; постоли – ox-hide footwear; полонина ~ a mountain meadow.*

Combined renomination (most often transcription with descriptive periphrase) is rather effective (although with many words) method of a maximal conveying of realia semantics connected with a linear text expansion. *"А про вечорниці так і не згадуй!"* - *"And also, don't mention to her the Vechernitzi, the*

evening gathering and revel of youths and maidens "Many traces and indications of them are perceptible in the waggoners (tschoumaks)" .

Calque (word-for-word translation) is a special type of loan when structural and semantic language models are rendered element by element with the help of target language material means. There is full and partial calque.

Sometimes realia almost absolutely losetheir denotative meaning and function only in the connotative terms of local characteristics dimming. This happens most often when they are part of a trope. In such cases it is appropriate to apply **interlingual connotative transposition** (transposition on the connotative level) replacing Ukrainian realia with English realia with another denotative but equivalent connotative meaning: *Ukr. сагайдак −Eng. quiver.*

The method of **assimilation** conists in rendering semantic and stylistic features of source language realia by foreign equivalents that are realia of target language.

There is another type of semantic and stylistic realia equivalent rendering. It is called contextual realia interpreting. This type of semantic and stylistic realia rendering is inextricably connected with the integrity of a literary text and means the interpretation of realia essence in the near context.

The above mentioned list of realia translation methods is not absolute. Translation is a creative and individual business. Each author can produce other ways how to get the context of realia across to a readerwith the help of his/her talent, his skills of writing.

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