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SECTION 9. Chemistry and chemical technology.

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SYNTHESIS OF CONJUGATED SULFONAMIDES AND THEIR HETEROCYCLIC DERIVATIVES

Abstract: *Ethoxymethylene malonodinitrile was found to be an active reagent in the synthesis of N-2,2-dicyanoethylene sulfonamides. In the obtained compounds, the nitrile groups had different spatial arrangements, and, therefore, upon their interaction with hydrogen sulfide, even in the cold, only one nitrile group transformed into the thioacetamide group. The interaction between the sulfonamides and hydrazine and hydroxylamine produced pyrazoline- and oxazoline derivatives of sulfonamides. Upon reaction with arylsulfonyl guanidine, ethoxymethylene malonodinitrile easily underwent heterocyclization with a high yield of N-3-amino-4-Z-R-arylsulfonyl pyrimidines.*

Key words: *hetaryl sulfonamides, ethoxymethylene malonodinitrile, pyrimidine-, oxazoline- and pyrazoline sulfonamides, alkylating agent.*

Language: *English*

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1. INTRODUCTION

The presence of heterocyclic units in sulfonamides broadens their spectrum of activity against pathogenic microorganisms. The emergence of drug-resistant strains of microorganisms necessitates the development of novel sulfonamide compounds with specific antimicrobial properties.

The synthesis of hetaryl sulfonamides involves their activation with functionally substituted fragments. For instance, the synthesis of sulfonamides containing a thiazolidine group involves the production of an active form of the compound through the reaction of arylsulfanyl hydrazine with aldehydes [1, P.627]. It was found that nucleophilic 5-endo-trig cyclization of N-homoallyl sulfonamides is a simple way of construction of pyrrolidine cycles [2, P.2693).

A reaction between sulfonamides with an acyl group and aromatic aldehydes was used to obtain

chalcones which appeared to be active synthons for heterocyclic compounds [3, P.475]. Upon reaction with malononitrile, hydrazine, hydroxylamine and urea in the presence of $AcONH_4$, they produce, respectively, pyridine, pyrazole, isoxazole and piperidine derivatives. Reactions between arensulfonyl imines and N,N-dinucleophiles result in the production of various N-sulfonylized heterocycles [4, P.2171].

2-Phenyl quinoxaline was synthesized by using as synthons1-functionally substituted N-(2-phenyl-2,2-dichlorethyl)arensulfonamides which form heterocycles with ortho-phenylenediamine [5, P.470].

The synthesis of synthons for construction of various heterocyclic compounds was extensively described in [6]. There is a vast amount of information on synthesis of bipolar synthons and their heterocyclization available elsewhere.

Ethoxymethylene malonodinitrile (EMMD) is a promising agent for production of bipolar conjugated sulfonamides. Even though EMMD and its properties were investigated in the past [7, P.4889], its use as an alkylating agent was described relatively recently [8, P.92].

2. EXPERIMENTAL

Infrared spectra of the synthesized compounds were obtained on Nicolet iS10 spectrophotometer.

NMR spectra were recorded on Varian T-60, Tesla-477 and Bruker-250 operating at 60, 80 and 250 mHz frequency, respectively.

Synthesis of N-(2,2-Dicyanoethynyl)aryl sulfonamides I(a-d).

General procedure: 0.05 moles of arylsulfonamide I(a-c) were dissolved in 50 ml of absolute ethanol; 0.06 moles of NaOH or KOH were added; the mixture was boiled for 30 min and then cooled, after which 0.05 moles of ethoxymethylene malonodinitrile were added. The mixture was boiled for 1.5-2 hours and then evaporated until its amount was reduced by half. After cooling and filtration of the sediment, the solution was recrystallized from a mixture of benzene and ethanol.

Compound I(a). Upon recrystallization from benzene, the yield was 11.8 g (87.3%). Melting point: 280 ^{0}C dec.

Compound I(b). Yield: 11.3 g (83.8%). Melting point: 268 ^{0}C dec. Found, %: N, 15.47. $C_{11}H_8N_3O_2SNa$. Calculated, %: N 15.81.

Compound I(c). Yield: 79.9%. Melting point: 268 ^{0}C dec. (from benzene). Found, %: C 59.72; H 4.26; N 12.19. $C_8H_{15}N_3O_2S$. Calculated, %: C 61.15, H 4.43, N 11.93.

Compound I(d) was obtained by the above-described procedure with the only difference that the target product was precipitated during the boiling. It was then filtered, flushed out with water, dried, and recrystallized from ethanol. Yield: 87.6 %. Melting point: 151-152 ^{0}C. Found, %: C 59.6, H 3.09, N 12.16. $C_{16}H_{11}N_3O_2S$. Calculated, %: C 59.07, H 3.41, N 12.92.The infrared spectrum did not contain any absorption bands for NH and OH groups, which means that the obtained compound is a cyclic product. The difference in the absorption bands of the two nitrile groups (2210 и 2220 cm^{-1}) is an indication of their different spatial arrangements.

Synthesis of N-2-Methoxyphenyl-N-2,2-cyanothioacetamide methylene-4-methyl phenyl sulfonamide (IIa) and -1-phenylsulfonyl-2-(cyanothiocarbamoyl)methyl-1,3-benzoxazole (IIb).

Dry hydrogen sulfate was bubbled through the solution of 50 g of compound I(c) or I(d) in ethyl alcohol until a complete fall-out of the yellow precipitate. The mixture was heated at 50-60 ^{0}C for 15 min and then cooled. The precipitate was filtered and recrystallized from ethanol.

Compound II(a). Yield: 81.6%. Melting point: 204-206 ^{0}C. Found, %: C 53.28, H 4.01, N 11.81, S 18.12. $C_{18}H_{17}N_3O_3S_2$. Calculated, %: C 53.47, H 3.65, N 11.69, S 17.84.

Compound II(a). Yield: 81.6%. Melting point: 204-206 ^{0}C. Found, %: C 53.28, H 4.01, N 11.81, S 18.12. $C_{18}H_{17}N_3O_3S_2$. Calculated, %: C 53.47, H 3.65, N 11.69, S 17.84.

Compound II(b). Yield: 85.8%. Melting point: 196-198 ^{0}C. Found, %: C 56.22, H 4.73, N 11.41, S 16.23. $C_{16}H_{13}N_3O_3S$. Calculated, %: C 55.80, H 4.42, N 10.84, S 16.55. NMR spectrum ^{1}H, $CDCl_3$, δ. ppm: 2.15 s (NH_2), 7.95 m (2H, CH – CH), 7.22 – 7.65 (5H, C_6H_5), 7.65 – 7.8 (4H, C_6H_4).

Synthesis of 4-Amino-2-aryl sulfamide-5-cyano pyrimidines (IIIa-b).

0.01 moles of aryl sulfonyl guanidine were dissolved in 30 ml of absolute ethanol. 1 ml of morpholine and 0.01 moles of ethoxymethylene malonodinitrile were added to the solution. The mixture was boiled for 30-35 min, cooled, and neutralized by adding ice-cold acetic acid. The precipitated crystals were collected by filtration, flushed with water and recrystallized from ethanol

Compound III(a). Yield: 74.9%. Melting point: 208-210 ^{0}C. Found, %: C 49.59, H 4.11, N 24.05, S 11.65. $C_{11}H_8N_3O_2S$. Calculated, %: C 49.77, H 3.83, N 24.29, S 11.07. NMR spectrum ^{1}H, DMSO, δ. ppm: 6.1 s (NH), 8.3 m (NH_2), 7.1 – 7.8 (SH, C_6H_5).

Compound III(b). Yield: 70.1 %. Melting point: 188-190 ^{0}C. Found, %: C 49.69, H 3.71, N

24.43. $C_{12}H_{11}N_5O_2S$. Calculated, %: C 49.82, H 3.83, N 24.21.

Synthesis of 3-Amino-4-cyano-5-N-(arylsulfonamide)-1,2-pyrazolines (IVa-b) and oxazoline (IVc).

25 mmoles of compound I(a) or I(b) and 30 mmoles of hydrazine hydrate and hydroxylamine were dissolved in 50 ml of ethanol. 3 ml of 5 N NaOH were added to the reaction mixture, which was then boiled for 40-50 min and cooled. The precipitated crystals were collected by filtration, flushed with water and recrystallized from ethanol.

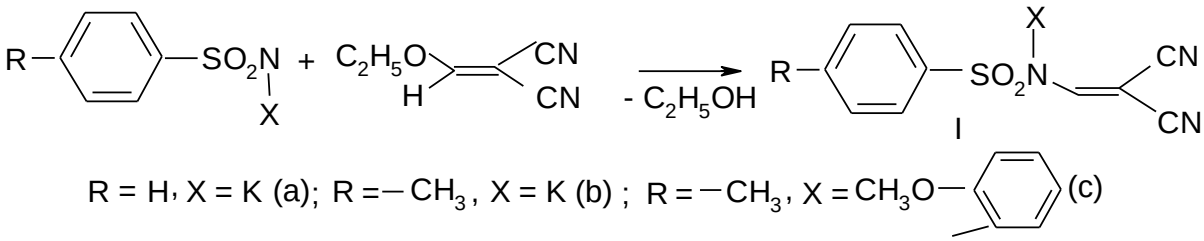
Compound IV(a). Yield: 52.8 %. Melting point: 225-226 ^{0}C. Found, %: C 45.82, H 4.31, N 26.98. $C_{10}H_{10}N_5O_2S$. Calculated, %: C 45.49, H 3.81, N 26.58.

Compound IV(b). Yield: 67.8 %. Melting point: 272.5-273.5 ^{0}C. Found, %: C 47.69, H 4.81, N 24.04. $C_{11}H_{12}N_5O_2S$. Calculated, %: C 47.42, H 4.34, N 25.24.

Compound IV(c). Yield: 55.1 %. Melting point: 271.5-272.5 ^{0}C. Found, %: C 47.29, H 4.61, N 20.88. $C_{11}H_{11}N_4O_2S$. Calculated, %: C 47.09, H 4.31, N 20.06. NMR spectrum ^{1}H, $CDCl_3$, δ. ppm: 2.315 (3H, CH_3), 3.4 s (2H, NH_2), 6.7 d (NH oxazoline), 7.55 d (2H arom.),7.7 d (2H_B, arom.).

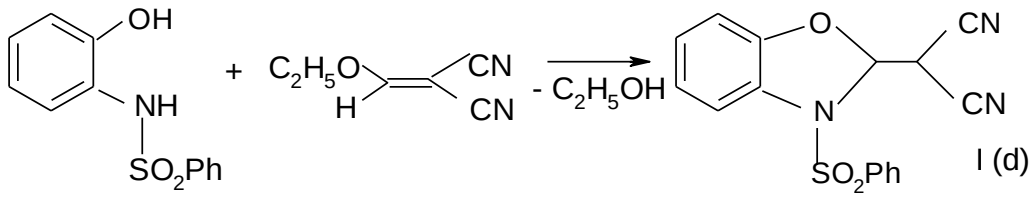
3. RESULTS AND DISCUSSION

Our study shows that this compound appears to be an active N-alkylation reagent for sulfonamide compounds under mild conditions:



Scheme 1

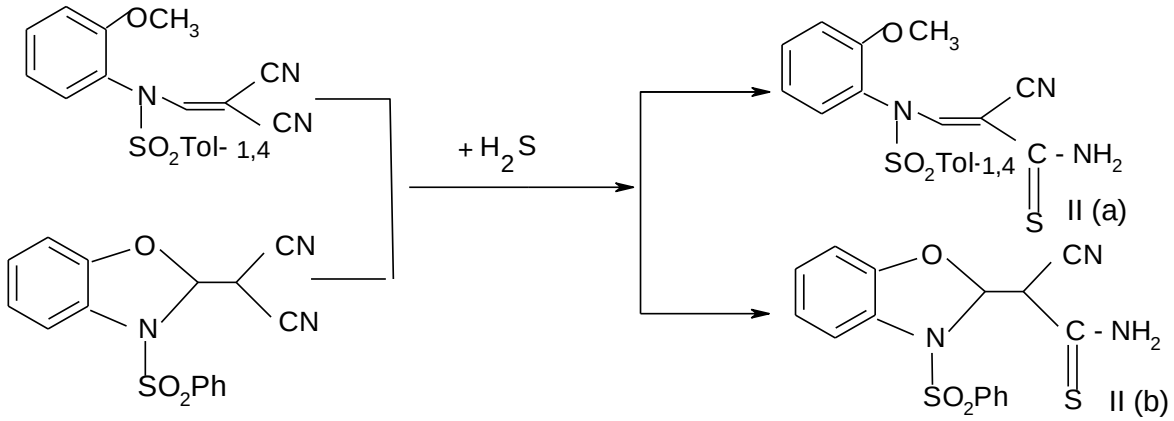
The reaction between EMMD and benzenesulfo-N-(2-oxyfenyl)amide has some peculiarities. First, there occurs a condensation reaction, which is then followed by cyclization:



Scheme 2

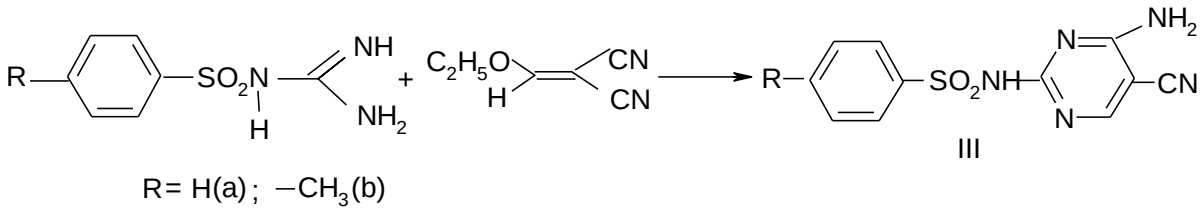
The mass spectrum of compound I(d) shows that one of the main directions of disintegration of the molecular ion is due to characteristic breakdown of a malonodinitrile group as evidenced by the peak at m/z 259.

The infrared spectra of compounds I(a-d) show a difference in the absorption bands of two nitrile groups (2210 and 2220 cm^{-1}), which proves that they have different spatial arrangements. This is apparently due to the influence of the sulfonamide group on the closest nitrile group. Therefore, upon the interaction of compounds I(c) and I(d) with hydrogen sulfate, even in the cold, only one nitrile group is transformed into the thioacetamide group:



Scheme 3

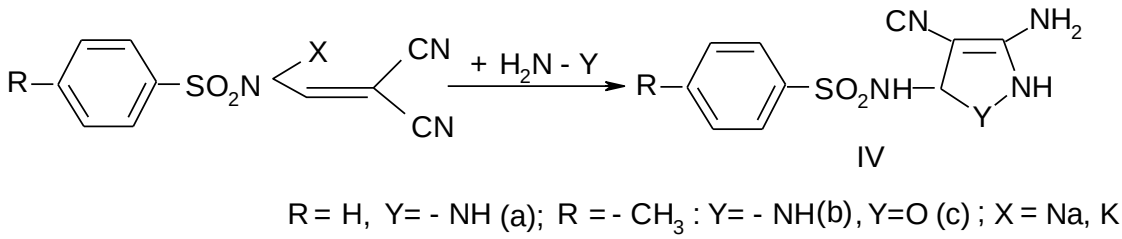
EMMD and its derivatives easily bind with guanidine sulfonamides and form pyrimidine sulfonamides in 75-80% yield:



Scheme 4

Pyrazolederivatives of sulfamides have a high antimicrobial activity [9, P.159]. They can be used as anti-inflammatory, as well as analgesic drugs [10, 11]. Pyrazole containing N-acylsulfonamides appeared to be strong EP-3 receptor antagonists (12). Their scope mainly depends on the composition of functional groups. Synthesis of such compounds is of interest.

N-(2,2-Dicyanoethynyl)aryl sulfonamides I(a-b) appeared to be effective synthons in the synthesis of oxazoline- and pyrazoline sulfonamides in 55-60% yield:



Scheme 5

The compound (IVb) was studied for antimicrobial activity. Results are given in the table 1.

Optimum concentration for suppression of Staphylococus aureus is found to be 1 mol/l · min. $\cdot 10^{-2}$; Escherichia tuphi – 1,2 mol/l · min. $\cdot 10^{-2}$; Penicillium – 2,9 mol/l · min. $\cdot 10^{-2}$.

The investigation showed that synthesized dinitrilesulfamides are synthons for the synthesis of biologically active heterocyclic compounds. These compounds, like 1,3-dipolar, synchronously attach to 1,2- and 1,3-polarophiles without the isolation of intermediates. Biological testing showed their high antimicrobial properties.

Table 1.

Bactericidal properties of 3-amino-4-cyano-5-(4-methylphenylsulfamido)-1,2-pyrazoline.

Concentration, %	Exposure per minute	Name of strain		
		Staphylococus	Escherichia tuphi	Penicillium
0,01	10	+	+	+
	20	+	+	+
	30	+	+	+
	40	+	**x**	—
	60	+	**x**	—
0,05	10	+	—	—
	20	**x**	—	—
	30	**x**	—	—
	40	**x**	—	—
	60	—	—	—
0,1	10	+	**x**	—
	20	**x**	—	—
	30	—	—	—
	40	—	—	—
	60	—	—	—
Standard: preparation in solution of 45% ethanol	+	+	+	+

«+» - Growth of microorganisms
«—» - Complete destruction of microorganisms
«**x**» - 30-40% destruction of microorganism

References:

1. Yoshi SN, Shak KD, Chauhan NA (1991) J. Indian. Chem. Soc. 1991, 68, No. 11, pp.627 – 631.
2. Ichikava J, Lapointe E, Ticai Z (2007) Chem. Common. 2007, 26, pp.2693 - 2696.
3. Mustafa OS, Ahmad RA (2003) Phosphorus Sulfur Silicon Relat. Elem. 2003, 178, No. 3, pp.475 - 480.
4. Sokolov VB, Aksenenko AY, Martynov IV (2007) Izv. RAN, Ser. Chem. 2007, 11, pp.2171 - 2177.
5. Rozentsveig GI, Rozentsveig IB, Mirskova AV, Levtsovskaya GG (2006) Zh. Org. Khimii. 2006, 42, No. 3, pp.470 - 472.
6. Babichev FS, Sharanin YA, Litvinov VP, Promonenkov VK, Volovenko YV (1985) Vnutrimolekulyarnoye vzaimodeystviye CN-, OH- and SH-grupp; Naukova Dumka: Kiev, 1985, 199 P.
7. Zones GJ (1952) Am. Chem. Soc. 1952, 74, pp.4889 - 4892.
8. Kukhar BP, Pavlenko NG (1977) J. Org. Chem. 1977, 13, pp.92 - 96.
9. El-Gaby Mohammed SA, Tahanadia M, Micky JA, El-Sharieb MA (2002) Acta Chim. Slov.., 2002, 49, No.1, pp.159 - 164.
10. Talley JJ, Penning TD, Collins PW, et al. (2016) Patent 6586603 USA.
11. Lindyi KM, Cheng H, Sakya SM, et al. (2016) Patent 6531492 USA.

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SECTION 19. Management. Marketing. Public administration.

RELATIONAL POLITICS IN PUBLIC ADMINISTRATION TÊTE-À-TÊTE PUBLIC OPINION

Abstract: *Public opinion is the complex of beliefs expressed by a significant number of persons on an issue of public importance. A public opinion has an issue of national significance and a group of persons who are concerned affected by the issue. The different views on the issue must be expressed and the size of the publics who are interested in the issue must be big enough to attract attention. Public opinion is a collection of views held by persons interested in the subject. Thus a person unaffected by or uninterested in an issue does not contribute to public opinion on the subject.*

Key words: *public opinion, administration, belief, national issue, decision.*

Language: *English*

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INTRODUCTION

"Service to citizens and to the public". The definition of the role of public administration, government and self-government in the new political and economic conditions has not attracted sufficient attention. This is connected with the overall ambiguity of the role of public and private sectors and of the responsibility of the State for creating conditions for their development [1]. So far, reform documents only point out these problems at a general level. There is little understanding of the fact that this should be a principal conceptual change with practical consequences for the definition of functions and concrete tasks of public administration, the shape of its institutions, the means for its activities and its relations to citizens and to the public. The issue has its political, economic and other dimensions, and it is naturally determined by the Constitution and the legal order.

What has been made so far both at the theoretical and practical level is not sufficient for the transition from the system in which public administration was understood primarily as a tool of power of the Party and State, to targeted and consistent implementation of the contemporary concept of democratic public administration[2].

Modern democracies understand public administration primarily as service to citizens and to the public. Such understanding of the basic role of public administration is the foundation from which its principles (such as transparency, publicity, accountability, public control of administration), forms and methods of activities, requirements for professional and impartial performance etc. are derived.

The focus of public administration lies in providing public services. In addition to traditional services (municipal, health care, school, transport services etc.), they also include some "classical" administration activities in advanced countries, such as issuing licenses, permits, documents, certificates, providing information etc. A number of these activities are no longer viewed as an exclusive domain of the State. Our new experience shows that many operational tasks, professional decision-making, execution of supervision, testing etc. can be decentralized and transferred to self-government or to private entities [3].

Shifts in this area have their limits, though. Economic aspects cannot be the only guide (and, moreover, it has been proved on many occasions abroad that the exclusion of public tasks from the responsibilities of public authorities did not bring expected savings, however, it resulted in the erosion of the values and principles upon which the provision of public services was based).

It should also be stated clearly that stress on the conception of public administration as service to the

public does not mean, on the other hand, a denial of the power, authoritative component of public administration. This comprises tasks in the sphere of security and internal order, regulation and enforcement of the fulfilling of legal duties, the application of administrative supervision tools, the imposition and execution of sanctions within the limits of administrative authority etc [4].

The material content and extent of public tasks and public services depend on how the importance of social automatisms and the extent of state intervention is viewed at a specific period, how the balance between the freedom of an individual and his responsibility for himself on the one hand, and solidary care of the human community for an individual and responsibility for him on the other hand operate. This is a matter of protection and execution of interests and values recognized by the decisive majority of citizens.

The basic characteristic of public administration comprises the knowledge of heterogeneous and often contradictory aims that it is obliged to defend. In the present period of principal social changes and new demands which must be secured despite limited financial and human resources, public policy is exposed much more to pressure to make responsible selection of priority aims and to redefine tasks and functions of public administration in accordance with the aims. A permanent professional and political dialogue is fundamental for the process of defining these tasks and functions, leading to new economic, legal and other solutions [5].

MATERIALS AND METHODS

This paper is an extensive analytical addendum of the research data utilized in the unpublished research entitled, "Efficient Public Service Delivery Model for Government Offices", at Cebu Technological University bearing on alternative decisions of the issues and challenges that confront leaders in the actual practice of management. As such, this up to-date research sought to untangle administrative decisions on the merit of: Issues and challenges cited in the unpublished research on precedence is the need to provide alternative-normative- prescriptive political decision(s) to effect leadership in administration; and Per provision of alternative-normative-prescriptive political decision(s) is a need to derive or untie discernment as part of leadership in administration, towards sustainability in any form or its opposite.

RESEARCH METHODOLOGY

This study is an arm-chair research which uses the alternative normative- prescriptive political approach **tête-à-tête** the published research entitled, "Efficient Public Service Delivery Model for Government Offices", at Cebu Technological University. Issues and challenges elicited from the informants from the aforementioned were extracted and further analyzed arriving at possible alternative decision(s) for leaders to undertake to derive or untie inherent element of leadership in administration.

RESULTS AND DISCUSSION

The changing role of public administration. Some aspects of contemporary public administration would appear similar to someone working in government decades earlier, while other aspects have been undergoing fundamental transformation. While the changes are numerous, there are two that deserve highlighting.

The first, as alluded to previously, is the increasing emphasis on the role of the public administrator as a manager, and the need to apply the managerial tools familiar in the private sector. This drive toward generic management has almost certainly enhanced the efficiency and perhaps the effectiveness of the public sector, but its critics argue that it has also undervalued the peculiarly public nature of management in government, and the need to think about public sector values other than sheer economic efficiency [6].

A second major change in public administration has been the increasing linkage of state and society in the delivery of public services. Government is no longer an autonomous actor in implementing its policies but often depends upon the private sector and/or the third sector to accomplish its ends. This linkage of state and society may enhance the effectiveness and the legitimacy of government but it also presents government with problems of accountability and control. Blending state and society means that public administrators must become more adept at bargaining and governing through instruments such as contracts, rather than depending upon direct authority to achieve the ends of government.

Bureaucracy is now less centralized and less hierarchical than ever in its recent history. The degree of centralization of the bureaucracy and of government policy has varied by country, but in almost all there is less power now vested in the center than in the past. Just as working with civil society may require a different set of skills than governing alone, so too will working more closely with subnational governments, or with quasi autonomous organizations that are nominally connected to ministerial authority but which may be designed to act more on their own [7].

Orientation to securing public interests as the starting point.

Assume that the functions and tasks of public administration can and must be derived from identified and recognized public interests since securing them is the reason of its very existence. The way in which general or public interests are accepted and satisfied is a cross-section of historical traditions, the concrete development stage of the respective society, the existing institutional framework of public administration as well as the enforced political emphasis.

The orientation of public administration towards securing public interests can be understood as its direction towards the solution of concrete problems of individual citizens and population groups and towards securing the functioning of the society as a whole. In this respect, public administration is interconnected with public policy, the aim of which is to identify, express and recognize public interests and to choose adequate means of satisfying them. Of course, the process of identifying, recognizing and satisfying public interests is always influenced by politically and ideologically affected interpretation. Identified and recognized public interests can become a good basis for differentiating the functions of public administration. In this direction, significant changes took place after 1989 especially in connection with the economic reform, political democratization and with the protection of basic human rights and freedoms [8].

Functions of public administration.

Public administration and the whole public sector are going through a radical change of their position in relation to economy while the elimination of ineffective and bureaucratically burdensome methods of direct interventions in the economic sphere from the totalitarian era does not mean any liquidation of the economic regulatory function of the State and the related tasks of public administration.

The principal changes result from the changing internal and external conditions of the development and functioning of economy, primarily from the needs to complete the market transformation of economy and from the international process of globalization of economic relations. The consequence of this is the need to increase the potential and effectiveness of the State and public administration in respect of the implementation, promotion of a rational development of economic proportions through macro-regulation, control of the privatization process of state-owned enterprises and public services, securing free competition and transparency in its implementation, securing an effective exercise of ownership rights of the State and other public entities, support of the private sector, especially of small and medium-sized enterprises, the development of effective cooperative relations between the public and private sectors, drafting and implementing effective sectoral policies, especially securing internal and external security, regional policy, transport policy, information and communication policy, environmental policy, education policy, social policy, employment policy and health care policy [9].

A well-functioning public administration and public sector provide conditions for the prosperity of private enterprise by creating an optimum and rational infrastructure by means of modernizing communication networks, systems of information services for citizens and businesses, through providing professional assistance to territorial self-government authorities, through support to investments in public interest etc.

It requires an increased quality and capacity of public administration in the sphere of regulation and control of the compliance with conditions and rules of the market environment, particularly the conditions of free competition and the elimination of monopolies, securing the quality, technological level, products free from health damaging defects and consumer protection. An important role of public administration lies in restricting "grey" economy, in securing proper tax collection, in discerning and preventing economic crime. In connection with the discharge of these and other tasks, public administration is in charge of public funds management (collected from tax-payers in the form of taxes, charges and other public dues under the law and simultaneously used in their general interest), and the state-owned movable and immovable property which, after all, should also serve all citizens. The financial area is remembered in the Constitution at least in the provisions on the state budget, the final state account and on an audit carried out by the Supreme Audit Office; the regulation of the "details" - which can be, however, of far-reaching importance - is implied in ordinary laws [10].

The general legislation on the management of national property from the period before 1990, which is a residue of the previous regime, is still in force, leaving the management of state-owned property practically in the hands of the Executive. Neither any law has been adopted in accordance with Article 11 of the Charter to stipulate which property necessary for securing the needs of the whole society, for the development of the national economy and for public interest may be owned by the State, a municipality or certain legal entities, nor any legal regulation of the management of state property has been passed which would, among other things, regulate the relationships

between the legislative and the executive power in this respect so that every significant case of the disposal of state-owned property could be in accordance with the law [11].

Thus a modern, rationally and effectively functioning public administration is a substantial and irreplaceable prerequisite for the economic growth.

Another significant function of public administration is to secure and strengthen democratic institutions and mechanisms. Two main directions of the development of political democracy can be mentioned here: a) towards the strengthening of institutions and mechanisms of representative democracy, and also b) towards the development of institutions and mechanisms of participative democracy, i.e. direct participation of citizens and their organizations in the management and administration of the State [12].

The concept of administration as a tool of power still survives in a general understanding surviving from the authoritarian regime, which has maintained, on the one hand, the negative attitude of the population to public administration and, on the other hand, distorted ideas and stereotypes in the behavior and actions of a number of politicians and officials. Now it is primarily a matter of exercising a citizen´s right to participate, including the expression of their views in a referendum, and other forms provided for by the legislation, the right to information (which some of our politicians find so difficult to get along in the ongoing legislative approval of the Information Bill) and to democratic control [13].

The basic issue is how the public administration fulfills its role, how and how effectively it fulfills its tasks and functions and how it is evaluated by citizens in this respect. However, a prerequisite for the targeted action of public administration is that it should know its role and its tasks and that it should be motivated sufficiently to fulfill them, and that citizens should be made familiar with them in an understandable form [14].

CONCLUSION

The official actions of public administrators are based on public trust carrying legal accountability. Public office is a public trust. Public officers employees should at all times be accountable to the people, serve them with utmost responsibility, integrity, loyalty, and efficiency; act with patriotism and justice, and live modest lives Section 1 of Article XI of the New Constitution of the Republic of the Philippines.

References:

1. Chapman RA (2000) Ethics in the Public Service for the New Millennium. Aldershot: Ashgate.
2. Hood C (1998) The Art of the State: Culture, Rhetoric and Public Management. Oxford: Oxford University Press.
3. Peters BG (1987) 'Politicians and Bureaucrats in the Politics of Policy-making', in J.-E. Lane (ed.), Bureaucracy and Public Choice. London: Sage.
4. Bouckaert G, Pollitt C (2003) Public Management Reform: A Comparative Analysis, 2nd ed. Oxford: Oxford University Press.
5. Breton A (1996) Competitive Government: An Economic Theory of Politics and Public Finance. Cambridge: Cambridge University Press.
6. Peters BG, Pierre J (2001) Politicians, Bureaucrats and Administrative Reform. London: Routledge.
7. Niskanen W (1971) Bureaucracy and Representative Government. Chicago: Aldine/Atherton.
8. Pierre J, Peters BG (2000) Governance, Politics and the State. Basingstoke: Palgrave.
9. Rockman BA (1998) 'The Changing Role of the State', in B.G. Peters and D.J. Savoie (eds), Taking Stock: Assessing Public Sector Reforms. Montreal and Kingston: McGill-Queen's University Press, pp. 20–44.
10. Savoie DJ (1994) Reagan, Thatcher, Mulroney: In Search of A New Bureaucracy. Pittsburgh: University of Pittsburgh Press.
11. Plowden W (1984) Governance. London: Royal Institute of Public Administration.
12. Peters BG, Pierre J (2000) 'Citizens Versus the New Public Manager: The Problem of Mutual Empowerment', Administration and Society, 32: 9–28.
13. Kerwin C (1999) Rulemaking. Washington, DC: CQ Press.
14. Peters BG (2001) The Future of Governing, 2nd ed. Lawrence: University Press of Kansas.

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QUANTUM MODEL OF CHARGE TRANSFER IN METAL-POLYMER ELECTRETS

Abstract: *Possibility of building a quantum model of the electret state is analysed. A new approach applied in development of the metal-polymer electret model consists in presenting the process of metal transfer from an electrode to polymer as macroscopic quantum effect.*

Key words: *electret state, quantum-mechanical approach, exciton, wave function, Planck's constant*.

Language: *English*

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1. INTRODUCTION

Currently, along with the traditional electret formation technologies, technologically unsophisticated and non-energy-intensive methods have been developed for polymer materials polarization by their heat treatment in contact with metals. These methods allow to combine the product forming operations and electric polarization of polymer matrix in one technological process, thus increasing the performance characteristics of the products made of structural polymers [1].

Metal-polymer electrets (MPE) are a specific type of electrets formed in the process of polymer films contact with a pair of short-circuited electrodes made of dissimilar metals. When "electrode1–polymer–electrode2" sandwich is heated to the polymer yield (or melting) temperature, thermally stimulated current (which density amounts to units-tens pA/cm^2) is induced in the external circuit connecting the electrodes. MPE are known for specific mechanism of their structure formation consisting in metal ions diffusion into the polymer matrix in viscous-flow state, their subsequent neutralization and coagulation of the formed atoms as clusters [2].

Phenomenological description of the electret effect is based on the results of fundamental researches conducted by the founders of the modern electret theory B. Gross, G.M. Sessler, J. van Turnhout, A.N. Gubkin, B.I. Sazhin, G.A. Luscheikin et al. [3-6]. The limited possibilities of the classical electrodynamics apparatus used for description of the charge transfer processes in polymer dielectrics is one of the main reasons for the lack of correct theoretical model of the electret state formation in polymers.

The relation between the dielectric conductivity and its microstructure predetermines availability of quantum mechanisms affecting the charge transfer processes and formation of electret states in the dielectric [7]. Multi-particle nature of such system complicates quantum-mechanical computations, thus, causing to remain at the level of qualitative description of the process of electret states occurrence.

A new approach applied by us in development of MPE model consists in presenting the process of metal transition from an electrode to polymer film as macroscopic quantum effect [8] which equation explicitly includes the Planck's constant. The article addresses the possibility of building a quantum model of MPE electret state which basic provisions

can be applied to the processes of formation of practically all types of electrets.

2. EXCITON WAVE FUNCTION

In the first approximation, a metal surface can be represented as the ordered collection of positive ions that create their own negative image (polarized negative) in the polymer that comes into contact with it (Fig. 1.1, *a*). Polarized "reflection" of the metal ion in the polymer matrix can be considered as a quasiparticle with a negative charge that is equal in absolute value to the metal ion charge and effective mass equaling to the mass of such ion [9, 10].

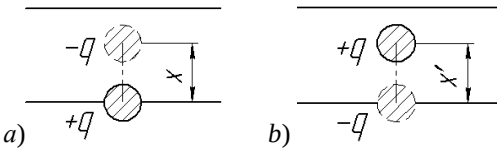

Figure 1 – Formation of charge states when a metal ion is transferred to the dielectric.

If the time period for metal ion transfer to the dielectric is less than the relaxation time, image 1, *a* is transformed as shown in Fig. 1, *b*. In other words, a negatively charged hole appears at the site of the metal ion and creates the already positively charged "reflection". From the standpoint of the quantum theory of solids, such system can be regarded as a bound dipole, or exciton, and the system transition from state (1, *a*) into state (1, *b*) can be interpreted as sequence of two turns of exciton by angle $\varphi = \frac{\pi}{2}$ [11].

Assuming that exciton of 1, *a* type is described by wave function ψ_a, then wave function ψ_b which describes the exciton after angular movement can be obtained from the unitary transformation as [11]:

$$\psi_b = U^{-1}\psi_a = e^{-\frac{i\varphi}{\hbar}(\mathbf{nM})}\psi_a, \qquad (1)$$

where U^{-1} is the unitary operator, φ is the exciton turn angle, $\hbar$ is the Planck's constant, **M** is the intrinsic angular momentum (spin), **n** is the normal to the surface. Absolute value of angular momentum M is related to Pauli spin matrix σ as $M = \frac{\sigma\hbar}{2}$ [12].

Equation (1) can be re-written as follows:

$$\psi_b = \left\{\cos\left[\frac{\varphi}{2}(n\sigma)\right] - i\sin\left[\frac{\varphi}{2}(n\sigma)\right]\right\}\psi_a.$$

Since the substance particles are predominantly fermions, then $n\sigma = 1$ [10] for them, so:

$$\psi_b = \left\{\cos\frac{\varphi}{2} - i\sin\frac{\varphi}{2}\right\}\psi_a. \qquad (2)$$

The statement of the problem permits us to restrict ourselves to just the real part of the proportion (2):

$$\mathrm{Re}\,\psi_b = \cos\frac{\varphi}{2}\psi_a. \qquad (3)$$

Then the first and second turns of exciton by 90 degrees shall be described by wave functions as:

$$\psi_b' = \cos\frac{\pi}{4}\psi_a = \frac{1}{\sqrt{2}}\psi_a,$$
$$\psi_b = \cos\frac{\pi}{4}\psi_b' = \frac{1}{2}\psi_a. \qquad (4)$$

Let us assume that wave functions ψ_a and ψ_b are "plane waves", i.e. $\psi_a = a\exp\left(-\frac{iW_a t}{\hbar}\right)$ and $\psi_b = b\exp\left(-\frac{iW_b t}{\hbar}\right)$, where W_a and W_b are energies of the plane waves. If their amplitude vales are equal ($a = b$), and taking into account (4) we obtain: $2\exp\left(-\frac{iW_b t}{\hbar}\right) = \exp\left(-\frac{iW_a t}{\hbar}\right)$. Taking the logarithm of the reduced equation brings us to: $W_a = W_b + i\frac{\hbar}{t}\ln 2$. Since ln2 ≈ 0.7, the resultant equation will be as follows:

$$W_a - W_b = 0{,}7i\frac{\hbar}{t}. \qquad (5)$$

Equation (5) allows to consider the value $0{,}7i\frac{\hbar}{t}$ as excitation *V*, and since the energy is a real value, it is possible to take instead of $0{,}7i\frac{\hbar}{t}$) only the *ImV*, i.e. $0{,}7\frac{\hbar}{t}$. From the mathematical point of view, transition to only real component in the right-hand part of equation (5) is not quite correct, but in view of the laws of physics it might be considered as a part of the underexponential equation corresponding to the plane waves energy.

The energy of the exciton charges interaction is determined by the known formula [13]:

$$W = -\alpha\frac{e^2 n\Omega^2}{x^4}\left(\frac{\varepsilon - 1}{\varepsilon + 2}\right)^2, \qquad (6)$$

where α and ε are the dielectric susceptibility and dielectric permittivity of the medium respectively, *e* is the electron charge, *n* is the particles

concentration, Ω is the volume taken by them, x is the distance between charges.

In accordance with the basic provisions of the quantum theory of solids, particles concentration n, as well as the probability density, can be presented as the squared absolute value of the wave function ψ^2 [14]. Indeed, the wave function or the wave vector (a.k.a. vector of state), in its broadest sense, characterizes a certain information field which comprehensively determines the physical system. Probability interpretation of the wave function was proposed by M. Born and does not exhaust its complete physical meaning. In the Sommerfeld quantum theory of metals (see, e.g., [15]) the wave function describes the particles density as well (i.e. their quantity or concentration). Besides, this concept does not contradict the Born's interpretation, since if the state is more probable, then, naturally, there are more particles in it.

Then, we can write the following expression for interaction energies:

$$W_a = -\alpha \frac{e^2 \psi_a^2 \Omega^2}{x^4} \left(\frac{\varepsilon - 1}{\varepsilon + 2} \right)^2, \qquad W_b = -\alpha \frac{e^2 \psi_b^2 \Omega^2}{x^4} \left(\frac{\varepsilon - 1}{\varepsilon + 2} \right)^2. \tag{7}$$

By substituting the values of physical quantities from equations (4) and (7) into expression (5) and by taking simple transformations, we obtain:

$$W_a - W_b = \frac{3}{4} W_a = \frac{3}{4} \frac{e^2 \psi_a^2 \Omega^2}{x^4} \left(\frac{\varepsilon - 1}{\varepsilon + 2} \right)^2 = 0,7 \frac{\hbar}{t} \tag{8}$$

(according to (5)).

As it has been shown in [16], electrical conductivity of polymers in contact with metals is determined by disintegration energy W_d of ionized molecules that characterizes the accumulation depth of the structural defects which may function as electron traps:

$$\gamma = \gamma_0 \exp\left(-\frac{W_d}{kT} \right), \tag{9}$$

where γ_0 is the constant temperature-independent multiplier, k is the Boltzmann constant, T is temperature.

The value of time interval t in formula (5) is close to the value of relaxation time $\tau = \varepsilon\gamma$, where γ is the conductivity of the medium. Let's substitute time t with relaxation time τ in equation (8), and the exponent from formula (9) with the Maclaurin series. Then:

$$\psi_a \approx \frac{30}{x'} \left(\frac{\varepsilon + 2}{\varepsilon - 1} \right) \sqrt{\frac{\gamma_0}{\varepsilon}} \left(1 - \frac{W_d}{2kT} \right), \qquad \psi_b \approx \frac{15}{x'} \left(\frac{\varepsilon + 2}{\varepsilon - 1} \right) \sqrt{\frac{\gamma_0}{\varepsilon}} \left(1 - \frac{W_d}{2kT} \right). \tag{10}$$

where $x' = \alpha x$.

The form of expressions for wave functions describing the exciton rotation (Fig. 1) corresponds to spherical waves which can be interpreted as occurrence of excitations of the internal electromagnetic fields in the exciton system associated with the relaxation processes of polarization charges redistribution. The basis for these processes is the principle of "energy expediency" which is implemented in a specific way on each occasion. In our case, it is realized as the potential equalization inside the dielectric material caused by the charge transfer described by the continuity equation:

$$\frac{\partial n}{\partial t} + \operatorname{div} j = 0, \tag{11}$$

where j is the charge flow which can be expressed via wave functions [11]:

$$j = \frac{i\hbar}{2m} \left(\psi \frac{\partial \psi^*}{\partial x'} - \psi^* \frac{\partial \psi}{\partial x'} \right), \tag{12}$$

where m is the effective mass of the charged particles system, ψ^* is the conjugate value of the wave function.

Description of such processes requires introduction of certain assumptions on time dependencies that are implicitly available in equations (10) for the exciton wave functions. Since all processes of the charge transfer and redistribution in the system under study are limited by relaxation time τ, it is justifiable to introduce a corresponding chronal characteristic by means of Dirac δ-function [14]:

$$\psi = \frac{\psi_0}{x'} e^{-iA\delta(t-\tau)}, \qquad \psi^* = \frac{\psi_0}{x'} e^{iA\delta(t-\tau)}. \tag{13}$$

where A is the a dimensional constant.

Substitution of ratios (13) into equation (12) produces the following result:

$$j = \frac{i\hbar}{2m} \left(-\frac{\psi_0}{x'} \frac{\psi_0}{x'^2} + \frac{\psi_0}{x'} \frac{\psi_0}{x'^2} \right) = 0 \tag{14}$$

Then, in accordance with the continuity equation (11) it turns out that $\frac{\partial n}{\partial t} = 0$, and, consequently, n = const, meaning that the number of particles per unit volume of the dielectric phase space is constant which is supported by the balance between the particles inflow and outflow observed in the charge transfer process.

From the aforementioned, it follows that if real-quantitative changes inside the phase space do not exert any significant influence upon relaxation-structural behavior of the components of "dielectric-metal" physical system, the need remains to examine the chronal (temporal) relations between these processes.

3. CHARGE TEXTURE

Temporal, as well as any other coordinate transformations in quantum mechanics are defined by unitary operators [11, 14]:

$$\psi_i(t) = U_i(t)\psi(0), \qquad U_i(t) = \exp\left(-\frac{i}{\hbar}H_i t\right), \tag{15}$$

where $U(t)$ is the unitary time-shift operator, H_i is the Hamiltonian of a system with its own set of energy values W_i.

In accordance with the foregoing, when time values match the relaxation time τ, dynamic structures (excitations) associated with the flows of charged particles, as well as the flows themselves, disappear which means zeroing of their wave functions:

$$\psi_i = \frac{\psi_0}{x'} e^{-\frac{i}{\hbar}W_i(t-\tau)} = 0,$$

or in accordance with equations (10):

$$\frac{\psi_0}{x'} = \frac{30}{x'}\left(\frac{\varepsilon+2}{\varepsilon-1}\right)\sqrt{\frac{\gamma}{\varepsilon}} = 0, \tag{16}$$

or in accordance with equation (13):

$$exp\left(-\frac{i}{\hbar}W_i(t+\tau)\right) = exp\left[-iA\delta(t-\tau)\right]_{t=\tau} = 0. \tag{17}$$

The fulfillment of condition (16) is implemented only in the case when ε = -2, which is impossible for all known natural substances. However, condition (17) is quite feasible, since the huge negative value of the exponent index of about -10^{45} (which is obtained when the finite value is divided by the Planck's constant) can be regarded as the "vanishing" of the given physical quantity to zero, and the relaxation processes become dependent only on the time parameter.

The obtained expressions for the wave function (10) and (13) describing the event of charge transfer from the metal to the dielectric have a form of spherical wave which amplitude attenuates in time (Fig. 2, *a*). Such wavefront may propagate for a distance of not more than $c \cdot \tau$, where c is the speed of light. Since there are many waves of that kind, then, as the result of merging of several wavefronts, areas Σ are formed with higher values of the probability density (wave functions) (Fig. 2, *b*). Owing to spherical symmetry of the wave functions, areas Σ produce the structures which form is close to crystalline one (Fig. 2, *c*) and which are turned by 45 degrees relative to the initial position of the exciton (Fig. 2, *d*). Such areas correspond to higher values of charge densities, since high ψ^2 values are indicative of high electron densities and, consequently, of possibility to form strong bonding orbitals. In relation to the internal volume of the solid body in question, this is equivalent to establishment of strong cohesive bonds and formation of any quasi-crystalline, e.g. cluster, structure.

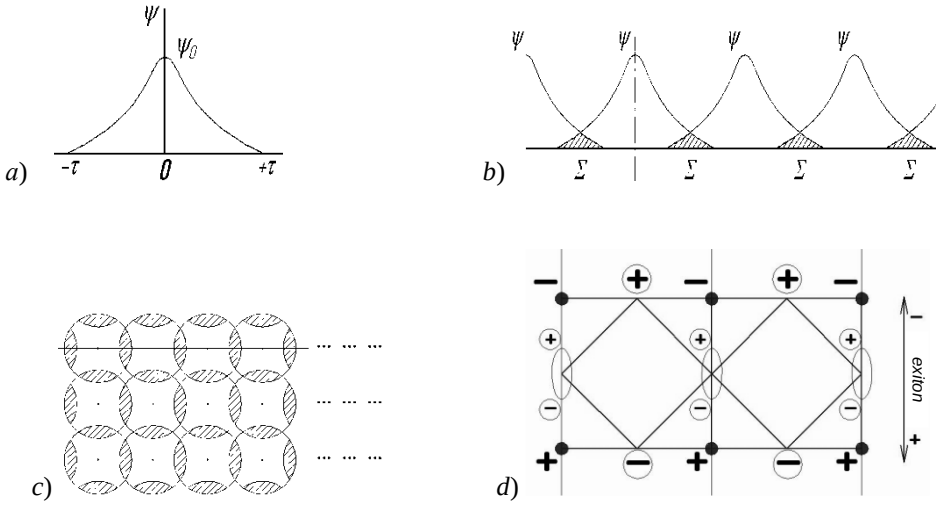

Figure 2 – Model of formation of the metal-polymer electret charge texture.

Noteworthy is a fact that "the turn angle" of pseudocrystalline structure formed during the charge transfer matches the turn angle of the wave vector which can serve as proof of correctness of the

proposed physical model. Arrangement of the pole signs of the structure being formed (Fig. 2, *d*) provide additional "stability" to the latter which demonstrates that the given physical system is capable of forming the electret states.

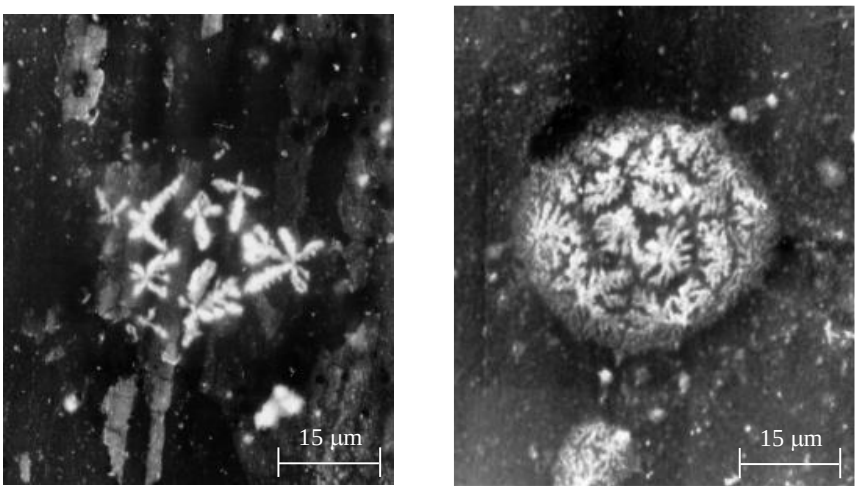

Figure 3 – Morphology of Ni particles in the polymer (polyvinyl butyral) matrix.

Our previously obtained experimental results on metal diffusion into the polymeric matrix during metal-polymer electret formation [17] can evidence as an indirect confirmation of the proposed model. It was shown by electron microscopy that colloid metal particles of dendritic and globular shape (of 2-5 μm) are forming in the near-electrode layer of the polymeric matrix (Fig. 3). This enabled us to affirm that metal may be in the polymer matrix in the form of clusters forming a distinctive quasi-crystalline structure.

CONCLUSION

A new approach was applied in development of physical model of metal-polymer electret which consists in presenting the process of metal transition from electrodes to polymer phase as the macroscopic quantum effect which equation explicitly includes the Planck's constant. Metal ions transfer into dielectric is regarded as occurrence of a bound dipole, or exciton. The expressions for wave functions describing the exciton rotation are obtained which can be interpreted as occurrence of excitations of the internal electromagnetic fields in the exciton system associated with the relaxation processes of polarization charges redistribution in the polymer dielectric. Owing to spherical symmetry of the wave functions, areas with higher values of the probability density can be presented in space as structures resembling the crystalline form which are turned by 45 degrees relative to the initial position of the exciton.

References:

1. Kestelman V (2000) Electrets in Engineering: Fundamentals and applications / V. Kestelman L. Pinchuk, V. Goldade. – Boston, Dordrecht, London: Kluwer Academic Publ., 2000. – 281 p.
2. Belyi VA (1979) Electret state of polymers in metal-polymer-metal joint. / V.A. Belyi, V.A. Goldade, A.S. Neverov, L.S. Pinchuk // Proc. USSR AS, 1979, Vol. 245, No 1, pp. 132-134
3. Sessler GM (1987) Electrets. Topics in Applied Physics, Vol. 33, 2nd Ed. / G.M. Sessler, Ed. – Berlin: Springer Verlag, 1987. – 385 p.
4. Gubkin AN (1978) Electrets / A.N. Gubkin. – Moscow: Nauka, 1978. – 182 p.
5. Luscheikin GA (1984) Polymer electrets / G.A. Luscheikin. – Moscow: Khimiya, 1984. – 184 p.
6. Sazhin BI (1986) Electrical properties of polymers, 3rd Ed. / B.I. Sazhin, Ed. – Leningrad: Khimiya, 1986. – 224 p.
7. Kozakov AT (2009) Physical foundation of electron spectroscopy of solid charged surfaces / A.T. Kozakov. – Rostov-on-Don: Publ. of Russian South Federal University, 2009. – 406 p.
8. Pitaevski LP (1992) Macroscopic quantum effects / L.P. Pitaevski // In Physical

Encyclopedia. – Moscow: Russian Encyclopedia, 1992, Vol. 3, pp. 29-31.

9. Zangwill A (1988) Physics at surfaces / A. Zangwill. – Cambridge: University Press, 1988. – 472 p.
10. Lyubimov DN (2012) Quantum tribophysics / D.N. Lyubimov, L.S. Pinchuk, K.N. Dolgopolov. – Rostov-on-Don: Publ. of Russian South Federal University, 2012. – 292 p.
11. Medvedev BV (1977) Principles of theoretical physics / B.V. Medvedev. – Moscow: Nauka, 1977. – 496 p.
12. Pavlov VP (1992) Pauli matrixes / V.P. Pavlov // In Physical Encyclopedia. – Moscow: Russian Encyclopedia, 1992, Vol. 5, p. 550.
13. Tamm IE (1989) Fundamentals of electricity theory / I.E. Tamm. – Moscow: Nauka, 1989. – 504 p.
14. Landau LD (1989) Theoretical physics, Vol. 3. Quantum mechanics (nonrelativistic theory) / L.D. Landau, E.M. Lifshits. – Moscow: Nauka, 1989. –768 p.
15. Kittel Ch (2005) Introduction to solid state physics, 8th Ed. / Ch. Kittel. – NJ: Wiley, 2005. – 703 p.
16. Goldade VA (1987) Electret plastics: Physics and material science / V.A. Goldade, L.S. Pinchuk. – Minsk: Nauka i tekhnika, 1987. – 231 c.
17. Goldade VA (1999) Polarizing mechanism of colloidal metal particles formation in polymer electrets / V.A. Goldade, L.S. Pinchuk, E.A. Tsvetkova // In Proc. 10th Int. Symp. on Electrets. – Delphi (Greece), 1999, p. 35-38.

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SECTION 8. Architecture and construction.

OFFERS ON LEGISLATIVE SETTLEMENT OF CONDUCTING TECHNICAL SUPERVISION ON HISTORICAL AND CULTURAL MONUMENTS

Abstract: *Technical supervision is an important element of repair and restoration works on objects of cultural heritage. The carried-out analysis of the legislation allowed to draw a conclusion on absence of the norms governing these relations. All documents are recommendatory documents of voluntary application. Authors offer the basic principles of carrying out technical supervision which have to be consolidated at the legislative level.*

Key words: *historical and cultural monuments, protection of monuments, technical supervision, restoration, licensing, legislation.*

Language: *English*

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When conducting any activities related to objects of capital construction (construction and assembly and repairs and restoration works), it is very important to take care of work reliability [1] since life cycle of objects of capital construction may be very long, and the results of construction and assembly and repairs and restoration works are exploited for an extremely long time. To provide the needed quality of such works by contractors at construction sites, external supervision takes place to check that every norm and regulation envisaged for any particular kind of work is followed [2]. When construction is carried out in state interests in the territory of the Russian Federation, the provisions on the customer representing the state, as approved by the Resolution of the State Committee of the Russian Federation on Capital Construction and Utilities Complex (Gosstroy of Russia) of 08.06.2001, №58 [3], defined technical supervision as controlling the quality of every construction, repairs, assembly and testing and launching operations executed by contractor at specific construction site and their agreement with the design solutions adopted. The City Construction Code of the Russian Federation [4], that came into force in 2006 introduced a new concept of «construction control» instead of the term "technical supervision" used before. In 2010 the Government of Russia streamlined the routines for executing construction control [5].

As for the monuments of history and culture, there is a special protective legislation in place in the Russian Federation, namely the Federal Law "On the Objects of Cultural Heritage (Monuments of History and Culture) of the Peoples of the Russian Federation" [6]. Instead of a classification envisaging new construction works, reconstruction and capital repairs adopted by the City Construction Code for new developments, monuments of history and culture may undergo capital repairs, restoration, conservation, re-establishment and adjustment to modern needs. Control over adherence to rules and regulations on doing repairs and restoration works at monuments of history and culture by contracting bodies is called "technical supervision" instead of "construction control".

Up till now no routines have been adopted that would stipulate executing technical supervision on sites of cultural heritage. In November 2014 the TK 082 "Cultural Heritage" Standardization Technical Committee headed by S.B. Kulakov, the Chief Architect of FSUE "Central Scientific Restoration Design Workshops" has designed, and the Federal Agency on Technical Regulation and Metrology has approved the national standard GOST R 56254-2014 "Technical Supervision on Sites of Cultural Heritage.

Basic Provisions" [7]. However, upon the Federal Law "On Technical Regulation" [8] coming into force, various standards (GOSTs, etc.) became the documents of voluntary application, provided the Government of Russia does not stipulate otherwise to define them obligatory. The list of national standards mandatory for use that came into force on July 01, 2015, provided the basis for adhering to stipulations of the Federal Law "Technical Regulations on Safety of Building and Structures" [9]. However that law contains no references to GOST R 56254-2014. Therefore, persons executing technical supervision on sites of cultural heritage may refute using the said national standard in their work, but follow their own intra-company standards instead.

Experts point out the need to develop a non-contradictory logical legislative system in the area of technical regulation [10], where the issues of preserving the monuments of history and culture belong, including those of technical supervision thereon.

Since protecting the monuments of history and culture is one of the tasks following from stipulations of the Constitution of Russia, we believe that technical supervision routines should be uniform over the whole of the Russian Federation; therefore they should be set forth at the level of the Government of the Russian Federation.

An important issue subject to regulation at the level of the Government of the Russian Federation is qualifying requirements that a person executing technical supervision should meet. To pursue such activities on historical and cultural sites the performer should be licensed to preserve objects of cultural heritage [11]. Technical supervision is not identified as a type of activity needing a separate license. We believe this is quite adequate. The task of technical supervision consists in checking the proper execution of various separate types of activity. If one would try to separate technical supervision as a specific type of activity subject to licensing, then one would have to recognize that such a person would be qualified enough to execute every type of licensed activities belonging to it, which can hardly be the case.

In our opinion a more logical approach would give the right to control certain type of activity to a person having a license to that activity him- or herself. Actually we suggest charging a person fluent in the controlled activities with executing such technical control.

Surely, it shall not be one and the same person at one and the same site both doing the works and executing technical supervision over them.

GOST R 56254-2014 envisages that technical supervision is executed by an entity licensed to draft design documentation on conservation, repairs, restoration, adjustment to modern needs and re-establishment of objects of cultural heritage. In other words, this concept suggests charging the design body with the task of technical supervision. We consider such an approach not to be founded too well. It is not always that the design organization is aware of fine details of certain kinds of restoration works. That is why design and production works at site of cultural heritage are always split apart. Design works stand apart (including the development of design documentation on conservation, repairs, restoration, adjustment and re-establishment of items of cultural heritage plus production of design documentation on engineering reinforcement of objects of cultural heritage, these two considered to be two different types of activities). Production works are still another set of activities (restoration and re-establishment of external and internal painting and artful decoration; restoration, conservation and re-establishment of architectural and stucco decor; repairs, restoration and re-establishment of roofing; repairs, restoration, conservation and re-establishment of basements and foundations; restoration, conservation and re-establishment of woodcarving; restoration and re-establishment of gilding; restoration and re-establishment of graphics, etc., 29 types of works total).

Design author is entitled to execute author's supervision of works conducted at construction site. In case of monuments of history and culture that becomes an author's obligation.

In case technical supervision would be the responsibility of the same entity that does author's supervision, the legislator would make no sense specifying these two processes separate from each other ("Works on preserving the object of cultural heritage included in the registry or an object of cultural heritage identified anew are conducted <...> also provided that technical, author's supervision and state supervision in the area of protecting objects of cultural heritage are executed" [6, Article 45]). We believe that since the Federal Law "On the Objects of Cultural Heritage (Monuments of History and Culture) of the Peoples of the Russian Federation" indicates author's supervision and technical supervision as two independent processes implemented in the course of works on preserving such monuments, that supervision should be executed by different entities.

Charging the entity that drafted design documentation with technical supervision does not devoid the latter of an authority to control the course of works. The right of project author to execute author's supervision is secured in the code of regulations "SP 11-110-99. Author's Supervision of the Construction of Buildings and Structures" [12], approved by the Resolution of Gosstroy of Russia of June 10, 1999 (This is confirmed in the approved by the Ministry of Capital Construction and Utilities of the Russian Federation of February 19, 2016 rulebook SP 246.1325800.2016 "Regulation on the

supervision of authors for construction of buildings and structures"). Note that the author's and technical supervision do not duplicate each other there:

- in the course of author's supervision the agreement is checked of the actual works to design (production) documentation;
- in the course of technical supervision the agreement is checked of the actual works to technical regulations, codes of rules and technologies of restoration works.

Note too that the national standard GOST R 56200-2014 "Scientific Management and Author's Supervision in the Course of Works on Sites of Cultural Heritage. Basic Provisions" [8], recommended in 2012 by the letter of Deputy Minister K.G. Cherepennikov, on the "Provision on Scientific Management and Author's Supervision in the Course of Repairs and Restoration Works on Sites of Cultural Heritage (Monuments of History and Culture). SRP-2007.1.1." [13], approved by the Federal Agency on Technical Regulation and Metrology is only of recommending nature, as noted before. Moreover, these were adopted by persons not duly authorized. According to the provisions of Part 2, Article 1294 of the Civil Code of the Russian Federation [14], routines for executing author's control and author's supervision are stipulated by the federal executive body on architecture and city construction. That body is the Ministry of Capital Construction and Utilities of the Russian Federation (in 1999 such a body was Gosstroy of Russia), and not the Ministry of Culture of the Russian Federation and not the Federal Agency on Technical Regulation and Metrology.

Since technical supervision on sites of cultural heritage is similar in nature with capital construction control, we assume that calculating customer expenses on the execution of technical supervision may be done using computational methodology employed to retrieve customer's expenses on construction control [5].

Organizational and technical issues of technical supervision on sites of historical and cultural monuments, such as documentation forms, documentation running routines, etc. may be covered by the Ministry of Culture as the federal body treating the issues of preservation of objects of cultural heritage. The Provisions on the Ministry of Culture of the Russian Federation [15] authorizes the Ministry with adopting restoration norms and regulations (Clause 5.2.22) [16]. Therefore, documents that accompany the execution of technical supervision (logbook forms, prescripts, content of reports) may be approved by the Ministry of Culture within the scope of its authority and does not require amending the Provisions on the Ministry or allocating additional funding from the Federal Budget.

Restoration works may be executed on site as a stand-alone activity. In case the issue is capital repairs of a building or adjustment of a building to modern needs, construction and assembly works are added to restoration proper. Controlling the adequacy of the full set of works in that case belongs to the two separate processes: technical supervision covers repairs and restoration works while construction control oversees construction and assembly works.

Persons executing construction control would need to have their self-regulated organization authorized to conduct construction control [17]. Those charged with technical supervision at restoration sites would need no special authorizations [18].

In case the legal act we propose is adopted at the level of the Government of the Russian Federation to regulate procedures of technical supervision at restoration sites, it would permit providing access to control activities to persons qualified in restoration only, thus improving the quality of restoration works.

References:

1. Ivanov AV (2013) Upravlenie kachestvom produkcii stroitel'stva [The management of the quality of the construction production] // Fundamental'nye issledovanija. — 2013. — №10-4. — pp.816-819. Available: http://elibrary.ru/item.asp?id=20303148 (Accessed: 03.06.2016)
2. Chetverik NP (2011) Organizacija stroitel'nogo kontrolja, kak sistemy bezopasnosti v stroitel'stve [Organization of building supervision as a security system in construction] // Tehnologija i organizacija stroitel'nogo proizvodstva. – 2011. — №1(2) – pp. 26-30. Available: http://elibrary.ru/item.asp?id=15596500 (Accessed: 03.06.2016)
3. (2001) Ob utverzhdenii Polozhenija o zakazchike pri stroitel'stve dlja gosudarstvennyh nuzhd na territorii Rossijskoj Federacii. Postanovlenie Gosudarstvennogo komiteta Rossijskoj Federacii po stroitel'stvu i zhilishhno-kommunal'nomu kompleksu ot 08

ijunja 2001 goda №58 [On approval of the customer in the construction for public use in the Russian Federation. Resolution of the State Committee of the Russian Federation for Construction and Housing and Communal Services of June 8, 2001 №58] // Vestnik upravlenija cenoobrazovanija i smetnogo normirovanija v stroitel'stve i zhilishhno-kommunal'nom komplekse. — 2001. — №2.

4. (2005) Gradostroitel'nyj kodeks Rossijskoj Federacii. Federal'nyj Zakon ot 29 dekabrja 2004 goda №190-FZ [Town Planning Code of the Russian Federation. Federal Law of December 29, 2004 №190-FZ] // Sobranie zakonodatel'stva Rossijskoj Federacii. — 2005. — №1 (chast' I). — pp.16.
5. (2010) O porjadke provedenija stroitel'nogo kontrolja pri osushhestvlenii stroitel'stva, rekonstrukcii i kapital'nogo remonta ob#ektov kapital'nogo stroitel'stva. Postanovlenie Pravitel'stva RF ot 21 ijunja 2010 goda №468 [On the procedure for carrying out construction supervision during construction, reconstruction and overhaul of capital construction. RF Government Resolution dated June 21, 2010 №468] // Sobranie zakonodatel'stva Rossijskoj Federacii. — 2010. — №26. — pp.3365.
6. (2002) Ob ob'ektah kul'turnogo nasledija (pamjatnikah istorii i kul'tury) narodov Rossijskoj Federacii. Federal'nyj Zakon ot 25 ijunja 2002 goda №73-FZ [On the objects of cultural heritage (monuments of history and culture) of the peoples of the Russian Federation. Federal Law of June 25, 2002 №73-FZ] // Sobranie zakonodatel'stva Rossijskoj Federacii. — 2002. — №26. — pp.2519.
7. Polovtsev IN (2015) Sovershenstvovanie norm, reglamentirujushhih dejatel'nost' po restavracii ob#ektov kul'turnogo nasledija [Improvement of the norms regulating activities for restoration of objects of cultural heritage.] // Universum: jekonomika i jurisprudencija. — 2015. — № 7 (18). — pp. 12. Available: http://elibrary.ru/item.asp?id=23661536 (Accessed: 03.06.2016)
8. (2002) O tehnicheskom regulirovanii. Federal'nyj Zakon ot 27 dekabrja 2002 goda №184-FZ [On technical regulation. Federal Law of December 27, 2002 №184-FZ] // Sobranie zakonodatel'stva Rossijskoj Federacii. — 2002. — №52 (chast' I). — pp.5140.
9. (2015) Ob utverzhdenii perechnja nacional'nyh standartov i svodov pravil (chastej takih standartov i svodov pravil), v rezul'tate primenenija kotoryh na objazatel'noj osnove obespechivaetsja sobljudenie trebovanij Federal'nogo zakona "Tehnicheskij reglament o bezopasnosti zdanij i sooruzhenij". Postanovlenie Pravitel'stva RF ot 26 dekabrja 2014 goda №1521 [Approval of the list of national standards and codes of practice (parts of such standards and codes of practice), the application of which is mandatory on the basis of compliance with requirements of the Federal Law "Technical regulation on safety of buildings and structures." RF Government Resolution dated December 26, 2014 №1521]// Sobranie zakonodatel'stva Rossijskoj Federacii. — 2015. — № 2. — pp.465.
10. Isakov VB (2011) Preemstvennost' pravovyh norm v sfere tehnicheskogo regulirovanija [Continuity of legal norms in the sphere of technical regulation] // Juridicheskaja tehnika. – 2011. — № 5. — pp. 184-191. Available: http://elibrary.ru/item.asp?id=20300926 (Accessed: 03.06.2016)
11. (2012) O licenzirovanii dejatel'nosti po sohraneniju ob'ektov kul'turnogo nasledija (pamjatnikov istorii i kul'tury) narodov Rossijskoj Federacii. Postanovlenie Pravitel'stva RF ot 19 aprelja 2012 goda №349 [On licensing of the conservation of cultural heritage (monuments of history and culture) of the peoples of the Russian Federation. RF Government Resolution of April 19, 2012 №349] // Sobranie zakonodatel'stva Rossijskoj Federacii. — 2012. — № 17. — pp.2018.
12. (1999) Ob odobrenii i vvode v dejstvie Svoda pravil "Avtorskij nadzor za stroitel'stvom zdanij i sooruzhenij. Postanovlenie Gosstroja RF ot 10 ijunja 1999 goda №44 [Approval and commissioning of the Code "Supervision of construction of buildings and constructions Gosstroy Decree of the Russian Federation on June 10, 1999 №44] // Bjulleten' stroitel'noj tehniki. — 1999. — №7.
13. (2011) SRP 2007. Svod restavracionnyh pravil. «Rekomendacii po provedeniju nauchno-issledovatel'skih, izyskatel'skih, proektnyh i proizvodstvennyh rabot, napravlennyh na sohranenie ob'ektov kul'turnogo nasledija (pamjatnikov istorii i kul'tury) narodov Rossijskoj Federacii» [PSA 2007 Code of restoration rules. "Recommendations for conducting research, survey, design and production of works aimed at the preservation of cultural heritage (monuments of history and culture) of the peoples of the Russian Federation."]. — M.: GUP CNRPM, 2011. — 217 p.
14. (2006) Grazhdanskij kodeks Rossijskoj Federacii (chast' chetvertaja). Federal'nyj Zakon ot 18 dekabrja 2006 goda №230-FZ [The Civil Code of the Russian Federation (Part Four). Federal Law of December 18, 2006 №230-FZ] // Sobranie zakonodatel'stva Rossijskoj Federacii. — 2006. — №52 (chast' I). — pp.5496.

15. (2011) Ministerstve kul'tury Rossijskoj Federacii. Postanovlenie Pravitel'stva Rossijskoj Federacii ot 20 ijulja 2011 goda №590 [About Ministry of Culture of Russian Federation. Russian Federation Government Resolution dated July 20, 2011 №590] // Sobranie zakonodatel'stva Rossijskoj Federacii. — 2011. — №31. — pp.4758.
16. Polovtsev IN (2012) Russian Rules of restoration. Obligatory or recommendatory document? // European researcher. — 2012. — №8-2 (27). — pp.1269-1271. Available: http://elibrary.ru/item.asp?id=17876713 (Accessed: 03.06.2016)
17. (2010) Ob utverzhdenii Perechnja vidov rabot po inzhenernym izyskanijam, po podgotovke proektnoj dokumentacii, po stroitel'stvu, rekonstrukcii, kapital'nomu remontu ob'ektov kapital'nogo stroitel'stva, kotorye okazyvajut vlijanie na bezopasnost' ob'ektov kapital'nogo stroitel'stva. Prikaz Ministerstva regional'nogo razvitija Rossijskoj Federacii ot 30 dekabrja 2009 goda № 624 [On approval of the List of types of works related to engineering surveys, preparation of project documentation for construction, reconstruction, repair of capital construction, which affect the security of capital construction. Russian Federation Order of the Ministry of Regional Development of 30 December 2009 № 624] // Rossijskaja gazeta. — 26.04.2010. — №88.
18. (2015) Pis'mo Ministerstva kul'tury Rossijskoj Federacii ot 04.06.2015 №2380-12-07. [Letter from the Russian Federation Ministry of Culture on 04.06.2015 №2380-12-07]

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SECTION 31. Economic research, finance, innovation, and risk management.

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THE STANDARD OF LIVING OF THE POPULATION IN THE RUSSIAN FEDERATION AND ITS SOME GENERAL THEORETICAL ASPECTS OF THE STUDY FOR THE 1ST QUARTER OF 2016

Abstract: *The article deals with general theoretical approaches for determining the statistical characteristics of the level and quality of life in the Russian Federation for the 1st quarter of 2016. There are given factors significantly affecting the quality and standards of living of its citizens. Here is offered some quality of life assessment for all regions of the country and are analyzed statistical standards of living represented by the Federal State Statistics Service of the Russian Federation until March 2016. The article has the examples of the main components of standards of living for the two groups of citizens. Income differentiation is showed as a recommendation of one of the methods of characteristics of the standards of living. The index of income concentration for the 1st quarter of 2016 was calculated and was made a comparison with 2015.*

Key words: *standard of living, the quality of life, wages, economics, consumer budget, statistics, income, employment, unemployment, differentiation, Gini coefficient.*

Language: *Russian*

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НЕКОТОРЫЕ ОБЩЕТЕОРЕТИЧЕСКИЕ АСПЕКТЫ ИЗУЧЕНИЯ УРОВНЯ ЖИЗНИ НАСЕЛЕНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ НА ПЕРВЫЙ КВАРТАЛ 2016 ГОДА

Аннотация: *В статье рассмотрены общие теоретические подходы определения статистических характеристик уровня и качества жизни населения Российской Федерации по состоянию на первый квартал 2016 года. Приведены факторы, существенным образом влияющие на качество и уровень жизни граждан страны. Предложены некоторые показатели оценки качества жизни для любых регионов страны. Проанализированы статистические данные уровня жизни населения, представленные Федеральной службой государственной статистики Российской Федерации вплоть до марта 2016 года. Показаны примеры основных компонентов стандарта уровня жизни для двух групп граждан. Рекомендован один из методов характеристики уровня жизни – дифференциация доходов населения. Рассчитан индекс концентрации доходов на первый квартал 2016 года, проведено сравнение с 2015 годом.*

Ключевые слова: *уровень жизни, качество жизни, заработная плата, экономика, потребительский бюджет, статистика, доходы, занятость, безработица, дифференциация, коэффициент Джини.*

Статистические методы по изучению уровня и качества жизни населения регионов Российской Федерации являются одной из наиболее важных отраслей экономической статистики [1] как научной дисциплины, так и вида практической деятельности самих органов государственной

статистики, которая занимается количественной характеристикой массовых явлений и процессов экономики.

С другой стороны, одними из простых показателей количественных изменений экономических явлений, как простых районов республик, так и ведущих регионов Российской Федерации, остаются показатели динамики цен, объема произведенной продукции индивидуальными и частными предпринимателями, численность населения, трудовых ресурсов, уровня безработицы, степени равномерности распределения доходов [2] и других показателей.

Однако, не все данные экономической статистики могут позволить систематическое количественное описание всех основных и ведущих аспектов экономического процесса, экономики Российской Федерации в целом.

Конечно, все статистические показатели необходимы и важны, прежде всего, органам федерального, областного, муниципального управления для решения вопросов, связанных с регулированием экономики региона и разработки дальнейших перспектив ее развития на ближайшее будущее.

В связи с этим, целью данной работы является ознакомление с общими теоретическими методами определения некоторых статистических характеристик уровня жизни населения Российской Федерации по состоянию на первый квартал (до марта месяца) 2016 года.

Согласно [3], те доходы населения, которые обеспечивают личный уровень потребления, определяющим образом влияют на качество и уровень жизни.

Уровень жизни представляет собой степень удовлетворения потребности людей, обеспечивая их жизнедеятельность [4]. Но потребности изменяются в зависимости от личности того, кто представляет эти потребности, общественных условий, в которых они формируются под воздействием разнообразных факторов. Поэтому, само понятие уровня жизни, которое выражается лишь через степень удовлетворения определенных потребностей, является комплексным.

С другой стороны, качество жизни имеет более широкое содержание по сравнению с понятием уровня жизни, хотя оба понятия тесно пересекаются в теории вопроса.

Автор современной книги [5] полагает, что качество жизни выражает степень развития и полноту удовлетворения всего комплекса потребностей и отдельных интересов людей, которые проявляются в жизнеощущении и разных формах деятельности.

В свою очередь, качество жизни также объединяет в себе совокупность всех материальных, социальных, культурных, моральных ценностей, которые позволяют каждому человеку стараться жить в гармонии с обществом, природой, самим собой.

Качество жизни включает в себя еще и состояния экономической, природной, социальной среды общества в целом, отдельного человека, а также духовную сферу его жизни, юридические и политические стороны, связанные с правами и свободами граждан, психологические стороны, идеологию, культурный уровень.

Проблема качества жизни [6] включает в себя положительные и отрицательные условия труда, результат профессиональной деятельности, характер работы согласно профессии, уровень благосостояния семьи, доступ к культурным и социальным ценностям общества, а также демографические, национальные, экологические стороны.

Еще в 80-х годах прошлого столетия, теоретические и практические исследования зарубежных ученых [7] показали, что второстепенное значение имеет состояние здоровья людей, повышение продолжительности жизни, снижение уровня смертности, положительная динамика рождаемости, ослабление степени тяжести заболевания, сокращение длительности болезней, развитие физических и умственных способностей населения, улучшение их общего самочувствия.

Мы полагаем, что для оценки качества жизни каждого региона России важными показателями являются расширение жилых площадей, обустройства жилища, дотация населенных пунктов, повышения прочности, разнообразия одежды и обуви.

Очень действенно на качество жизни влияет состояние образования населения, продолжительность и уровень обучения в социальных институтах, степень овладения научными знаниями, нравственное содержание, художественный уровень российской и зарубежной литературы, доступность физических и электронных библиотек, телевидения в различных режимах вещания, виртуальных музеев и многих других учреждений культуры [8].

Немаловажным фактором влияния на качество жизни являются также улучшение условия труда, развитие инновационного характера профессиональной деятельности, снижение напряженности на рабочем месте, повышение эффективности и обратной качественной отдачи каждого сотрудника, профессиональное соответствие, личных качеств, индивидуальных способностей людей, расширение свободы выбора профессии и специальности.

Наряду с такими параметрами рабочего труда [9], как длительность рабочего дня (обычно восьмичасовой рабочий день), доля ручного и автоматизированного (или частично автоматизированного), частота и характер производственного травматизма, для каждого человека очень важно моральное удовлетворение, которое приносит непосредственно сам труд, микроклимат в рабочем коллективе, материальная и общественная оценка трудовой деятельности.

Современные исследования [10] показали, что с переходом на рыночные отношения, возросла роль занятости населения и определенные гарантии от безработицы, что, несомненно, является еще одним показателем качества жизни населения. Текущая социально-бытовая обстановка в стране такова, что приходится учитывать уровень преступности, экологическую обстановку, стрессовое напряжение населения определенных регионов в связи с военными, национальными столкновениями или политическими конфликтами, терроризмом в соседних странах, государствах, наркоманией и эпидемиями в пределах обычных регионов страны.

По официальной статистике Федеральной службы государственной статистики Российской Федерации [11], по состоянию на первый квартал 2016 года, уровень жизни населения включает в себя данные об основных показателях денежных доходов, характеризующих объем, состав, основные направления их использования, а также, основные показатели социального обеспечения, социальной помощи населения, жилищный фонд и жилищные условия всех категорий населения.

Анализируя предложенные экономико-статистические данные, мы полагаем, что интерпретация понятия уровня жизни с точки зрения комплексного характера, представляется наиболее подходящей и удобной.

Считаем, что уровень жизни населения Российской Федерации, по состоянию на март месяц 2016 года, определяется как сложная экономическая категория, как некий социальный стандарт, характеризующий степень удовлетворения физических и социальных потребностей граждан практически всех категорий.

Исходя из этого, основными компонентами стандарта уровня жизни россиян остаются здоровье, питание, доходы населения, жилищно-коммунальные условия, домашнее имущество, платные услуги, культурный уровень граждан, условия труда, организация отдыха, социальные гарантии и социальная защита наиболее уязвимых жителей страны.

На основе проведенного анализа подходов к определению и объяснению категории уровня жизни, можно полагать, что первую группу составляют граждане с высоким и достаточным уровнем жизни, в то время, как вторую группу составляют граждане с низким или вообще нулевым уровнем жизни.

В первой группе, в основном, наблюдается практически полное удовлетворение расширенного круга потребностей, а также возможность накапливать определенную долю сбережений.

Во второй группе, согласно анализу, наблюдаются минимальные расходы на товары и услуги, отсутствие возможности удовлетворить минимальные потребности, вплоть до состояния доходов ниже прожиточного минимума.

В тоже время, можно выделить и некое промежуточное звено между обеими группами, так скажем, средний слой населения, в котором проявляются обязательные платежи жилищно-коммунальных услуг, удовлетворение потребностей без дополнительных расходов, однако, без возможности накопления сбережений.

Проведенный анализ благосостояния населения России позволяет более четко разграничить группы граждан в соответствии с определенными признаками, а также расширить понимание тех факторов, которые позволят выявить причины снижения уровня и качества жизни россиян.

В то же время, не следует забывать о том, что уровень жизни населения рассматривается в тесной связи с общими экономическими показателями страны, доходами населения, потребительским спросом, торговлей, ценами и ценообразованием, государственным бюджетом на определенный период, кредитом [12].

Например, доходы населения, являются одним из показателей, связывающий общие экономические показатели страны и уровень жизни граждан, что представляется как ключевой фактор, определяющий уровень жизни людей.

В связи с переходом к рыночным отношениям регионов в России [13], резко обострился процесс расслоения общества, в связи с чем, возникла необходимость использования методов анализа социально-экономической дифференциации населения по денежным доходам, естественно, на основе выборочного обследования бюджетов домашних хозяйств.

Уровень жизни также характеризуется показателями дифференциации материальной обеспеченности населения [14], то есть дифференциации населения по уровню доходов, среди которых особо можно выделить распределение населения по уровню среднедушевых денежных доходов, коэффициент

дифференциации доходов, индекс концентрации доходов или коэффициент Джини, коэффициент бедности.

Опираясь на проведенные расчеты и анализ результатов авторов [14], можно сказать, что важнейшим методом исследования дифференциации доходов населения является распределение населения по уровню среднедушевых денежных доходов на основе построения вариационных рядов [15] (графическое представление).

Эмпирические данные выборочного обследования бюджетов домашних хозяйств ранжируются и группируются в определенных интервалах по величине дохода. Для статистических характеристик предлагается использовать среднее значение душевого дохода, модальный доход или чаще встречающийся уровень дохода граждан), медианный доход или показатель дохода серединного ранжированного ряда распределения, средний доход или общий средний уровень дохода всего населения.

Полагаем, что модальный и медианный доходя были и остаются одними из важных структурных экономических показателей, которые характеризуют отклонение среднедушевого дохода от среднего значения для из исследуемых групп. Как показал анализ, проведенный нами выше, первая группа населения имеют доход выше среднего, вторая группа, соответственно, ниже среднего.

С учетом того, что в подобного рода статистических исследованиях, наиболее распространенным является децильный коэффициент дифференциации доходов [15] по неравенству в распределении доходов, мы рассчитали отношение минимального дохода у десяти процентов наиболее обеспеченных слоев населения, к максимальному доходу десяти процентов наименее обеспеченных слоев населения.

На основании формул, коэффициент дифференциации доходов рассчитывали путем сопоставления девятого и первого из децилей.

Также были учтены моменты, где функционально очень близким к децильному коэффициенту дифференциации доходов является коэффициент фондов [16], с помощью которого измеряют различие между суммарными или средними значениями доходов десяти процентов наиболее обеспеченной, и десяти процентов наименее обеспеченной части граждан.

Сам индекс концентрации доходов, или коэффициент Джини служит для измерения отличия фактического распределения доходов по численно равным группам граждан от их равномерного распределения или степени неравенства в распределении доходов населения.

Так как коэффициент Джини изменяется в пределах от ноля до единицы, что означает совершенное равенство и совершенное неравенство, то чем ближе индекс к единице, тем выше поляризация доходов в обществе.

Согласно проведенным расчетам в Государственном бюджетном образовательном учреждении Башкирской академии государственной службы управления при главе Республики Башкортостан и данным Федеральной службы государственной статистики Российской Федерации, в 2015 году показатель был в пределах 0,415, однако, по состоянию на март месяц 2016 года, показатель снизился до результата 0,413.

Это означает, что для таких статистических характеристик уровня жизни граждан, необходимо четко определить и установить границы дохода, которые обеспечивали бы минимально допустимый уровень. Для этого необходимо точное распределение и установление прожиточного минимума, стоимостной оценки минимального набора продовольственных и непродовольственных товаров, обязательные платежи и сборы с населения.

Конечно, коэффициент Джини не единственный индикатор уровня и качества жизни населения. Существует ряд других индикаторов, которые также можно рассчитать статистическими формулами [17].

В любом случае, оценку показателей доходов и уровня жизни составляют следующие экспертно рассчитанные индикаторы: бюджет прожиточного минимума в среднем на душу населения, среднедушевые денежные доходы, среднемесячная номинальная начисленная заработная плата, покупательная способность среднедушевых денежных доходов, коэффициент бедности по доходам, коэффициент Джини.

Таким образом, считаем, что необходимо продолжать исследования качества и уровня жизни граждан как на региональном, так и общероссийском уровне, то есть квалифицированное общественное обсуждение индикаторов их измерения, в том числе в рамках региональной дифференциации.

В свою очередь, данные исследования позволяют лучше интерпретировать реальную ситуацию в стране и отдельных ее регионах, разработать новые теоретические, методологические, методические подходы к изучению качества и уровня жизни населения.

Это способствует разработке новых статистических, социологических методов оценивания индексов, тесного взаимодействия научных достижений и практических результатов.

References:

1. Lugueva SN (2014) Statisticheskie metody izuchenija urovnja i kachestva zhizni naselenija. // Aktual'nye voprosy sovremennoj jekonomiki. – Mahachkala: Izdatel'stvo Nekommercheskoe partnerstvo "Dagestanskij territorial'nyj institut professional'nyh buhgalterov", 2014. – №4. – pp.442-446.
2. Abakumova NN, Volkova AS (2010) Reformy i novye problemy pensionnoj sistemy. // Idei i idealy. – Novosibirsk: Izdatel'stvo "Novosibirskij gosudarstvennyj tehnicheskij universitet", 2010. – T.2. – №2. – pp.2-8.
3. Prudnikova VV (2009) Privlechennye sredstva chastnyh lic v bankah Rossii. Statisticheskij analiz. – M.: Izdatel'stvo "Universitetskaja kniga", 2009. – pp.42-57.
4. Blanchard O, Illing G (2009) Makroökonomie. / Pearson Education. – 2009. – pp.313.
5. Zubec AN (2014) Istoki i istorija jekonomicheskogo rosta. – M.: Izdatel'stvo "Jekonomika", – 2014. – 463 p.
6. Zubec AN, Tarba IV (2013) Kachestvo zhizni v Rossii. // Zhurnal "Finansy". – M.: Izdatel'stvo "Knizhnaja redakcija zhurnala "Finansy", 2013. – №12. – pp.51-53.
7. Sandra LB (1987) Gender Schema Theory and Its Implications for Child Development: Raising Gender-Aschematic Children in a Gender-Schematic Society. // Psychology of women: Ongoing debates. – The University of Chicago Press. – Vol.8. – No.4. – 1987. – pp.598-616.
8. Vdovina ES, Kopylov AA (2013) Povyshenie kachestva zhizni sel'skogo naselenija – vazhnejshij celevoj orientir social'no-jekonomicheskogo razvitija Rossii. // Perspektivnye nauki. – Tambov: Izdatel'stvo "Fond razvitija nauki i kul'tury", 2013. – №1(40). – pp.96-99.
9. Fajzrahmanova GR (2014) Problema prodolzhitel'nosti rabochego dnja i rabochego vremeni v sovremennyh uslovijah. // Studencheskaja nauka i XXI vek. – Joshkar-Ola: Izdatel'stvo "Marijskij gosudarstvennyj universitet", 2014. – №11. – pp.157-159.
10. Ljubarec EV (2014) Problema zanjatosti i bezraboticy naselenija v Rossijskoj Federacii. // Jekonomika i socium. – Saratov: Izdatel'stvo "Institut upravlenija i social'no-jekonomicheskogo razvitija", 2014. – №1-2 (10). – pp.198-202.
11. (2016) Uroven' zhizni. Federal'naja sluzhba gosudarstvennoj statistiki Rossijskoj Federacii. Available: http://www.gks.ru/wps/wcm/connect/rosstat_main/rosstat/ru/statistics/population/level/ (Accessed 13.05.2016).
12. Portnova LV, Zolotova LV (2015) Problemy differenciacii naselenija po dohodam i ocenka bednosti naselenija. // Finansy, denezhnoe obrashhenie i kredit: teorija i praktika. Sbornik materialov mezhdunarodnoj nauchnoj konferencii. – M.: Izdatel'stvo "Mezhdunarodnyj centr nauchno-issledovatel'skih proektov", 2015. – pp.52-58.
13. Majorov AI (2014) Investicionnaja politika regiona v rynochnyh otnoshenijah. // XXI vek: itogi proshlogo i problemy nastojashhego pljus. – Penza: Izdatel'stvo "Penzenskij gosudarstvennyj tehnologicheskij universitet", 2014. – №4. – pp.432-436.
14. Suvorov AV, Suhorukova GM, Ivanov VN, Boldov ON, Moiseeva TA (2014) Problemy faktornogo analiza differenciacii dohodov naselenij. // Problemy prognozirovanija. – M.: Izdatel'stvo "Federal'noe gosudarstvennoe bjudzhetnoe uchrezhdenie nauki Institut narodnohozjajstvennogo prognozirovanija Rossijskoj akademii nauk", 2014. – №4. – pp.63-83.
15. Il'enkova SD (2004) Mikrojekonomicheskaja statistika. Uchebnik. – M.: Izdatel'stvo "Finansy i statistika", 2004. – 554 pp.
16. Beljaevskij IK (2016) Pokazateli denezhnyh dohodov i rashodov v izuchenii urovnja i kachestva zhizni naselenija Rossii. // Voprosy statistiki. – M.: Izdatel'stvo "Informacionno-izdatel'skij centr "Statistika Rossii", 2016. – №2. – pp.57-70.
17. Bobkov VN, Guljugina AA (2015) Monitoring dohodov i urovnja zhizni (1 kv. 2015 g.). // Uroven' zhizni naselenija regionov Rossii. – M.: Izdatel'stvo "Vserossijskij centr urovnja zhizni", 2015. – №2 (196). – pp.100-106.

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INVESTIGATION OLIGOMERS OF HEXENE-1 WITH THE AROMATIC FRAGMENT AS SYNTHETIC COMPONENTS TO PETROLEUM OILS

Abstract: *The essence of the research is achieving of base oils having higher viscosity index. For this purpose, α-olefin hexene-1 with reserves cheap raw materials, aromatic hydrocarbon in composition – oligomerization in toluene decisive environment. The advantages of toluene in the presence of oligamerization is that the toluene by forming a complex with Aluminum Chloride plays the role of so catalyst and process (oligomerization and alkylation) is going fuzzy, toluene cyclic cheaper than monomers and finally the active center of oligomers in environment is alkalized of toluene as a result of obtained product having a smaller unsaturated and it allows to produce hydrogenation stage of the technological process. In order to increase the viscosity index of petroleum oils of received oligoalkiltoluene was used as a synthetic component.*

Key words: *Base oils; viscosity index; hexene-1; toluene; aluminum chloride; oligomerization; alkylation; oliqoalkyltoluolenes; synthetic component.*

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1. INTRODUCTION

Lubricating oil is the system with multicomponent; they are used in order to ensure the long-term exploitation of machine and mechanisms. One of the most important components in the content of the lubricating oil is viscosity additives. The viscosity of the lubricating oil is the most important exploitation parameter and its price determines the viscosity class of the lubricating oil. The simplest and faithful among the different ways of gaining the oil having the good viscosity-temperature property is considered the usage of the viscosity admixtures – from the polymer combinations. Some polymers – as well as, polyisobuthylene, polyalkylmethacrylates, polyvinylbutyle ether are used as the viscosity additives [1-6]. But the additives shown today are considered “classics” and they aren’t used, because they don’t meet the requirements of the modern technique

The copolymerization being as a method of Chemical modification, is used for giving necessary properties to the polymer compounds and it means it is considered as the simplest way of carrying out purposeful synthesis. For this purpose, α-olefins, (in particular case hexene-1) oligomerizated with vinyl aromatic or karbocyclic monomers. But there is a simple way to get aromatic fragmented hexene-1 oligomers. Studies carried out at the "Polymer Additives" laboratory of Chemistry of Additives Institute showed that in composition of α-olefins aromatic hydrocarbons for example when it is oligomerizated in solvent environment of toluene creates oligoalkiltoluene and they can be used as a initial raw material for getting synthetic oil or component as well as multifunctional additive

depending on the nature of the initial α-olefin. Oligomerization products of C_8-C_{12} α-olefins actually are used as synthetic oil [7-10].

The advantages of toluene in the presence of oligamerization is that the toluene by forming a complex with Aluminum Chloride plays the role of so catalyst and process (oligomerization and alkylation) is going fuzzy, toluene cyclic cheaper than monomers and finally the active center of oligomers in environment is alkalized of toluene as a result of obtained product having a smaller unsaturated and it allows to produce hydrogenation stage of the technological process.

On this basis, it has been studied oligomerization of hexene-1 in the presence of toluene.

2. EXPERIMENTAL

The composition of the solvent in the presence of toluene Hexene-1 oligomerization is carried out as follows: three-neck flask equipped with mechanical stirrer, thermometer and drops funel placed on a cooling bath. Amount of solvent in a flask (hexane or heptane) + is a mixture of toluene. The amount of the solvent stirrer should be in the same amount with α-olefin (i.e. the ratio of 1:1 by weight). Blending is putting into operation in flask solvent 1-1, 5% - given with the amount of AlCl3 (table 1).

Table 1

The characteristics of products of oligomerization of 1-hexene in the presence of toluene.

Oligomerization conditions			Oligomers indicators		
temperature, °C	amount of solvent, %		yield, %	molecular mass	bromine number, qBr/100q
	toluene	$AlCl_3$			
20	0	1	86,9	4000	17,5
20	10	1	91,5	2500	2,7
20	20	1	92,3	1600	1,5
20	30	1	94,8	1000	1,0
40	20	1	95,1	800	1,2
0	20	1	93,7	1200	1,2
20	20	0,5	74,9	1500	1,2
20	20	1,5	96,5	1500	1,2

Composition and structure of synthesized compounds IR- and NMR-spectroscopy methods, element analysis (for carbon content determination) were investigated with fractionation of their content. For Research 20% were obtained in the presence of toluene in 100°C kinematic viscosity 7.3 mm^2/s taken from the oligomer.

In IR-spectrum (Fig. 1). 720, 760, 780, 825, 860 and 880 sm^{-1} frequency half substitute benzene (825 sm^{-1}) is obtained and α-olefins fragments corresponding to absorption lines. It should be noted that, the absorption bands corresponding to the value of two-and three benzenes fall on each other and making an accurate analysis is not possible. However, it was possible to determine that oligomer composition of according to 1,2-, 1,4- and 1,2,4-substituted there benzene. However, it was possible to determine that there are 1,2-, 1,4- and 1,2,4-substituted benzene in composition of oligomers.

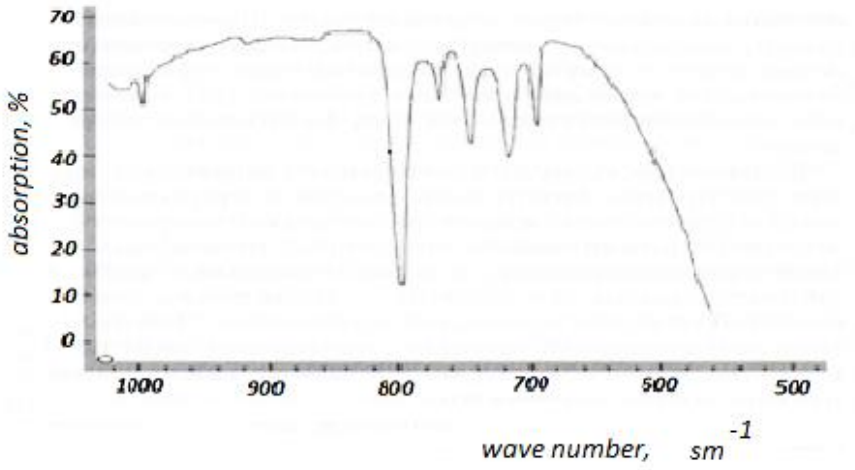
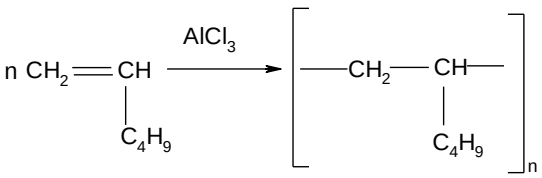


Figure 1 - IR- spectrum of oligoalkyltoluene.

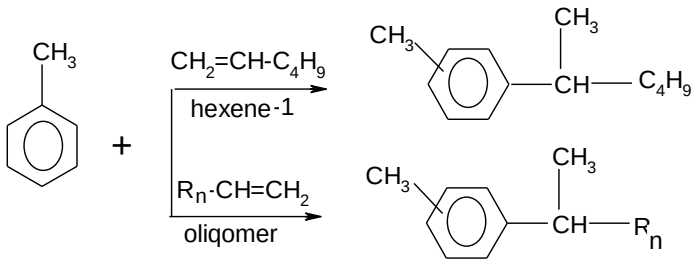
The results of NMR-spectroscopic analyzes confirmed the results of IR-spectroscopy. Suitable fragments of the methyl group CH_3-Ar, which is integral intensity of the hydrogen (2,1 mln^{-1}), suitable factor of benzene less than integral intensity of hydrogen (6.6 mln^{-1}). This means that in addition to three substitute formed benzene two substitute benzene. If only three substitute benzene were formed the intensity of the signals corresponding to the methyl group to hydrogen in that case three substitutes would be equal to the intensity of benzene protons. In the presence of toluene summarizing the results of the oligomerization process of hexene-1 it is possible to come such a conclusion, during the oligomerization of hexene-1 alkyl derivatives with a mixture of toluene are formed oligohexene alkyl derivatives.

Alkyl derivatives are formed from alkylation and oligomerization of toluene with hexene-1 and its oligomers. Thus, the process schematically can be shown as follows:

1. Oligomerization of hexene-1



2. Alkylation and oligoalkylation of toluene



3. Results and discussion

Viscosity-temperature properties of synthesized oilgoalkyltoluene as a synthetic component in composition of petroleum oils (И- 12А and М-6) have been investigated (table 2).

The results indicate that using from oligohexeniltoluene according to the viscosity index price it is possible to get a concentrated base oils meet modern standards (according to the modern requirements, kinematic viscosity at 100°C 8 mm^2/s viscosity index of the oil price should not be less than 93).

Table 2

Influence of concentration of Oligohexeniltoluene to viscosity-temperature properties of И-12А and М-6 oils.

Consentration of oligomers, %	Viscosity-temperature properties of condensed oil	
	viscosity, mm^2/s, in 100°C	Viscosity-index
И-12А oil + oligomer		
0	4,05	82
10	5,20	88
20	6,40	96
30	7,50	104
40	8,50	106
М- 6 oil + oligomer		
0	5,80	76
10	6,20	82
20	7,00	88
30	7,50	94
40	8,00	96
50	8,90	96

Synthesized oilgoalkyltoluene by the addition to M-6 oil oxidation stability and the freezing temperature of the oil has been studied (Table 3).

Table 3

Influence of oilgoalkyltoluene of the oxidation stability and of the freeze temperature of M-6 oil.

Oligomer concentration, %	Oxidation stability		T_{freeze}, °C
	settling, %	viscosity reduction, %	
0 (mineral oil)	4,32	117	-5
10	2,94	25,46	-12
20	1,30	21,93	-18
30	1,33	20,15	-21

4. Conclusions

Changing reaction conditions and the amount of toluene in decisive composition in the range of 2000-6000 molecular weight of oligoalkiltoluene was obtained. When obtained oligomer compounds are used in the amount of 20-30% in the composition of petroleum oils, their price of the viscosity index is increased to 96-104

The results indicate that using from oligohexenyltoluene according to the viscosity index price it is possible to get a concentrated base oils meet modern standards (according to the modern requirements, kinematic viscosity at 100°C 8 mm^2/s viscosity index of the oil price should not be less than 93).

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References:

1. Kuliyev AM (1985) Chemistry and Technology of Fuels and Oils. L: Chemistry 1985.
2. Akhmedov AI, Farzaliyev VM, Aliguliyev RM (2000) Polymeric Additives and Oils. Baku: Elm; 2000.
3. Yukich A, Vidovich E, Yanovich Z (2007) Additives to improve the viscosity index oils, Chemistry and technology of fuels and oils, . № 5, 2007, pp. 23-27.
4. Yanovich Z, Yukich A, Vidovich E (2009) Triple polymers of maleic anhydride and long chain alkylmethacrylate as a viscosity additive. Chemistry and technology of fuels and oils, № 4, 2009, pp. 33-37.
5. Akhmedov AI, Askerova KA, Isakov EU, Gamidova DS (2009) Synthesis of copolymers of bytylmethacrylate with allylnaphtanate and α-olefins as viscous additives to lubricating oils. Petro refining and Petro chemistry, №5, 2009, pp.31-32.
6. Akhmedov AI, Gamidova DS, Isakov EU (2014) Viscosity additives polyalkylmethacrylate-type, Germany: LAP Lambert Academic Publishing, 2014, 84.
7. Agakisheva MJ, Huseynov G, Azizov AL (1997) LT Oligomerization of higher alpha-olefins to produce synthetic oils. VI International Conf. in Chemistry and Physical chemistry of oligomers, Kazan, September 8-12. 1997, p. 115.
8. Akhmedov AI (2003) Results of research on the production of synthetic oils based on higher alpha-olefins. Azerbaijan oil industry, № 9, 2003, pp. 42-45.
9. Askerova KH, Aliyeva RV, Azizov AG (2011) Oligoalkilnaphtenate oils obtained by oligomerization of C_8-C_{10} α-olefins in the presence of new ion liquid catalyst systems / XII International national scientific and practical conference "Fundamental and applied research, development and application of high technologies in the industry ", St. Petersburg, 2011, Vol.3, Ch 1, 08-10 December, pp 192-194.
10. Askerova KH, Azizov AG, Aliyeva RV, Asgarova AS (2011) Oligomerzation of C_7 and C_{10} oligomers in oligoalkilnaphtenate oils in the presence of ion fluid-catalytic systems // Petro refining and Petro chemistry, 2011, №11, pp. 61-66.
11. Seidova KH, Azizov AH, Aliyeva RV, Nazarov IG, Abdullayeva AM (2015) (Oligo)alkylation of toluene with alpha-olefins in the presence of ionic liquids / International Turkic World Conference on Chemical Sciences and Technologies "ITWCCST", Sarajevo, 2015, OR-124, p. 153.
12. Azizov AH, Aliyeva RV, Seidova KH, Karayeva EM, Nazarov IG, Abdullayeva AM (2015) Oligomerization and alkylation of decene-1 in the presense of chloroaluminate ionic liquids // American Journal of Chemistry and Application, 2015; 2(3), pp. 21-26. (Online)

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ELECTROCARDIOGRAPHIC ABNORMALITIES IN SUBJECTS WITH OVERWEIGHT, OBESITY AND ABDOMINAL OBESITY

Abstract: *This article presented the prevalence of ECG abnormalities in subjects with overweight, obesity and abdominal obesity.*

Key words: *electrocardiogram, major and minor abnormalities, obesity*

Language: *English*

Citation: Ibragimova SI, Babayeva KS, Sadykova AD, Sharabitdinova GG, Shalkharova ZS, Shalkharova ZN (2016) ELECTROCARDIOGRAPHIC ABNORMALITIES IN SUBJECTS WITH OVERWEIGHT, OBESITY AND ABDOMINAL OBESITY. ISJ Theoretical & Applied Science, 06 (38): 31-35.

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BACKGROUND: Cardiovascular diseases (CVD) are the current problem of the world due to the high morbidity and mortality rate among the employable population. Despite progress in the prevention and treatment of CVD, they are still lead in the structure of morbidity and significantly affect such basic health indicators as morbidity, disability, mortality. As noted by many researchers, the level of cardiovascular morbidity and mortality in developed countries is reduced from year to year, whereas this figure tends to increase in developing countries [1,2].

Considering the evolution of the CVD, we can establish that mortality from CVD atherosclerotic origin grew rapidly in industrialized countries since World War II. This led to the conduct of epidemiological studies in Europe, which began in 1950, in particular in the USA Framingham study. Three main cardiovascular risk factors - high cholesterol, hypertension and smoking regularly

appeared in epidemiological studies until 1975. The last twenty years have confirmed the importance of these three risk factors, which are long-term predictors of adverse outcome of CVD. Several polymorphisms of genes have been shown to be associated with increased risk of developing CVD. Despite this, in the 90 years studies devoted to secondary prevention were priority than primary prevention [3-7]. As reported in the MONICA study, due to adequate secondary prevention observed reduction in mortality from myocardial infarction, while the morbidity remains stable. Similar conclusions were reached in the study REACH, which shows the lack of effectiveness of secondary prevention. DREAM study found that none ramipril and rosiglitazone does not reduce the incidence of cardiovascular events [8-10]. All this is of great interest and requires further study cardiovascular risk factors and the development of primary prevention measures.

Together with the study of behavioral and biological risk factors, is currently in the scientific world actively discussed the role of electrocardiographic (ECG) abnormalities, for an objective evaluation of the CVD. It was found that ECG abnormalities are significant prognostic marker of CVD independently of traditional risk factors [11].

Among the risk factors of CVD, obesity is the most common. Risk due to obesity contributes to the development of coronary and cerebral disorders in obese patients. In obesity observed damage of vessels, due to the fact that obesity predisposes to the development of dyslipidemia, diabetes, hypertension and sudden cardiac death. Besides these mechanisms, in obesity cardiomyocytes changes, characterized by degenerative phenomena [12]. ECG pathology more common in obese patients, which are manifested in the form of lower voltage, left ventricular hypertrophy, extension of left atrial [13]. There is evidence that visceral fat causes the appearance of pathologic ECG due to sympathetic activation, and was described cases of arrhythmia in patients with obesity [14]. In addition, weight loss was accompanied by the elimination of ECG abnormalities [15], which is similar to the results of research Colombia and Italy [16, 17].

Along with the association between ECG abnormalities and overweight, obesity, in the study of Korean scientists revealed the relations with the abdominal obesity.

AIM: Aim of present study is to investigate the prevalence of ECG changes depending on body mass index (BMI) and value of waist circumference in residents of Turkestan.

DESIGN, MATERIALS AND METHODS: Design of the study is based on a cross-sectional population-based study conducted in Turkestan region. Out of whole sample (1143 respondents), ECG changes have been studied in 14% (158). Out of all 158 patients, number of men was 48, women 110, respectively. The average rate of age of the studied men and women were 50.1 ± 13.7 and 52.1 ± 13.7 consequently. Height and weight were measured while subjects were wearing light clothing without shoes. Waist circumference was measured midway between the costal margin and the iliac crest at the end of a normal expiration. BMI was calculated as weight in kilograms divided by the square of height in meters.

Standard 12-lead ECGs were recorded with each subject in the supine position using strictly standardized procedures. ECGs were coded by a cardiology specialist using the Minnesota system [18]. ECG abnormalities were divided into minor and major abnormalities based on Minnesota criteria.

Major ECG abnormalities included**:**

3-1,4-1-Left ventricular hypertrophy (LVH)

4-1, 4-2-Major ST-T abnormalities

7-1-Complete left bundle branch block (LBBB)

8-3-Atrial fibrillation (AF)

Minor ECG abnormalities included**:**

5-3-Minor ST-T abnormalities

7-3-Incomplete right bundle branch block (RBBB)

7-6-Left posterior fascicular block (LPFB)

7-7-Left anterior fascicular block (LAFB)

8-1-1, 8-1-2, 8-1-3 Extrasystoles

8-7-Sinus tachycardia

9-7-Early repolarization

Sinus arrhythmia

The data was obtained using statistical package of program - Biostat. A chisquare (χ^2) test was used to compare prevalence rates of ECG abnormalities between groups with and without the obesity and abdominal obesity.

RESULTS: Determinants of ECG changes of 158 patients showed in Fig. 1. In 36.7% of patients pathological ECG changes were not registered. Out of major abnormalities the most often pathology was LVH, of minor abnormalities was incomplete bundle branch blocks.

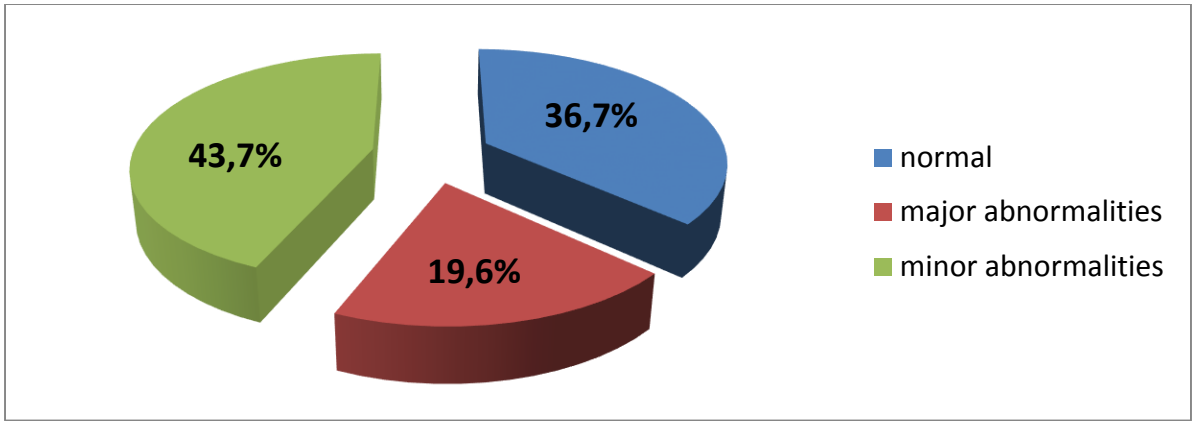

Figure 1 - Structure of ECG changes according to the Minnesota coding system.

Table 1

Prevalence of major and minor ECG abnormalities by Minnesota criteria in subjects with or without overweight and obesity.

Minnesota coding system	ECG abnormalities	BMI < 25		BMI > 25	
		n	%	n	%
Major abnormalities	LVH	10	14,1	16	18,5
	Major ST-T abnormalities	1	1,4	1	1,1
	Complete LBBB	1	1,4	1	1,1
	AF	-	-	1	1,1
Minor abnormalities	Minor ST-T abnormalities	-	-	2	2,3
	Incomplete RBBB	5	7	9	10,4
	LPFB	-	-	1	1,1
	LAFB	21	29,6	20	22,9
	Extrasystoles	1	1,4	2	2,3
	Early repolarization	1	1,4	4	4,7
	Sinus tachycardia	1	1,4	1	1,1
	Sinus arrhythmia	-	-	1	1,1
Normal		30	42,2	28	32,3
Overall		71	100	87	100
χ^2= 8,218; p=0,084					

Table 2 shows that the frequency of ECG abnormalities was not different statistically among individuals with and without overweight and obesity, living in Turkestan region.

Table 2

Prevalence of major and minor ECG abnormalities by Minnesota criteria in subjects with or without abdominal obesity.

Minnesota coding system	ECG abnormalities	WS < 94 men WS < 80 women		WS > 94 men WS> 80 women	
		n	%	n	%
	LVH	9	13,2	17	18,9

Major abnormalities	Major ST-T abnormalities	1	1,5	1	1,1
	Complete LBBB	1	1,5	1	1,1
	AF	-	-	1	1,1
Minor abnormalities	Minor ST-T abnormalities	-	-	2	2,2
	Incomplete RBBB	5	7,3	9	10
	LPFB	-	-	1	1,1
	LAFB	17	25	24	26,8
	Extrasystoles	-	-	3	3,3
	Early repolarization	2	2,9	3	3,3
	Sinus tachycardia	1	1,5	1	1,1
	Sinus arrhythmia	1	1,5	-	-
Normal		31	45,6	27	30
Overall		68	100	90	100
χ^2= 10,414; p=0,034					

In table 2 presented the prevalence of ECG abnormalities depending on value of WS. Both major and minor abnormalities were registered often in persons with abdominal obesity. Particularly in men with WS > 94 cm and women

with WS > 80 cm such abnormalities as LHV, AF, minor ST-T abnormalities, incomplete RBBB, LPFB, LAFB, extrasystoles, early repolarization were more revealed than in residents without abdominal obesity.

CONCLUSION:

1. This population-based study revealed that only 36.7% of people had normal ECGs.

2. Changes in cardiac electrophysiology were not varies by BMI.

3. Both major and minor ECG abnormalities were more often in subjects with abdominal obesity.

References:

1. Kislyak OA, Malysheva NV, Chirkova NN (2004) Factory riska serdechno-sosudistyx zabolevaniy v razvitii bolezney svyazannyx s aterosklerozom. Klinicheskaya gerontologiya. 2004. pp.3
2. Bokeriya LA, Gudkova RG (2011) Serdechno-sosudistaya xirurgiya. 2011. pp.34
3. Mahmood SS, Levy D, et al. (2014) The Framingham Heart Study and the epidemiology of cardiovascular disease: a historical perspective. Lancet. 2014.
4. Oladapo OO, Salako L, et al. (2010) A prevalence of cardiometabolic risk factors among a rural Yoruba south-western Nigerian population: a population-based survey. Cardiovasc J Afr. 2010.
5. Njelekela MA, Liu E, et al. (2011) Socio-economic status, urbanization, and cardiometabolic risk factors among middle-aged adults in Tanzania. East Afr J Public Health. 2011.
6. Vangjeli C, Dicker P, et al. (2011) A polymorphism in ACE2 is associated with a lower risk for fatal cardiovascular events in females: the MORGAM project. J Renin Angiotensin Aldosterone Syst. 2011.
7. Amann U, Kirchberger I, et al. (2014) Long-term survival in patients with different combinations of evidence-based medications after incident acute myocardial infarction: results from the MONICA/KORA Myocardial Infarction Registry. Clin Res Cardiol. 2014.
8. Dagenais GR, Gerstein HC, et al. (2008) Effects of ramipril and rosiglitazone on cardiovascular and renal outcomes in people with impaired glucose tolerance or impaired fasting glucose: results of the Diabetes REduction Assessment with ramipril and rosiglitazone Medication (DREAM) trial. Diabetes Care. 2008.
9. Vassilaki M, Linardakis M, et al. (2015) The burden of behavioral risk factors for cardiovascular disease in Europe. A significant prevention deficit. Prev Med. 2015.
10. De Ruijter W (2008) The additional value of routine electrocardiograms in cardiovascular

risk management of older people. Scand J Prim Health Care, 2008.
11. Yarnell JW, Patterson CC, et al. (2000) Comparison of weight in middle age, weight at 18 years, and weight change between, in predicting subsequent 14 year mortality and coronary events: Caerphilly Prospective Study. J Epidemiol Community Health. 2000.
12. Alpert MA, Terry BE, et al. (2000) The electrocardiogram in morbid obesity. Am J Cardiol. 2000.
13. Hillebrand S, de Mutsert R, et al. (2014) Body fat, especially visceral fat, is associated with electrocardiographic measures of sympathetic activation. Obesity (Silver Spring). 2014.
14. Fraley MA, Birchem JA, et al. (2005) Obesity and the electrocardiogram. Obes Rev. 2005.
15. Alpert MA, Nusair MB, et al. (2015) Effect of weight loss on ventricular repolarization in normotensive severely obese patients with and without heart failure. Am J Med Sci. 2015.
16. Falchi AG, Grecchi I, et al. (2014) Weight loss and P wave dispersion: a preliminary study. Obes Res Clin Pract. 2014.
17. Korean J (2010) Intern Med 2010. Variable Association between Components of the Metabolic Syndrome and Electrocardiographic Abnormalities in Korean Adults. Hong-Kyu Kim, Chul-Hee Kim et al.
18. Prineas R, Crow R, Zhang Zhu-Ming. (2010) The Minnesota Code Manual of Electrocardiographic Findings. Standards and Procedures for Measurement and Classification. Second edition, new and enlarged. New York, 2010.

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	ISI (Dubai, UAE) = 0.829	РИНЦ (Russia) = 0.234	PIF (India) = 1.940
	GIF (Australia) = 0.564	ESJI (KZ) = 1.042	IBI (India) = 4.260
	JIF = 1.500	SJIF (Morocco) = 2.031	

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SECTION 25. Technologies of materials for the light and textile industry.

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ANTISLIP RELIEF OF RUNNING SOLE'S SURFACE

Abstract: *The relief of running sole's surface with high antislip properties was considered. The relief consists from well-known antislipping elements and the elements have been developed by authors. These elements are particularly arranged and placed at the running surface to provide increased antislip properties of soles. The experiments proved high antislip properties of running soles surface were carried out.*

Key words: *running surface, antislip elements, antislip properties, breaking effect, coefficient of sliding friction, ground surface, supporting surface, bump and potholes of the ground.*

Language: *English*

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Introduction

To prevent the falling of a person walking on the slippery surface various of removable [1-3] and fixed [4-5] footwear devices have been developed and are being improved.

However their application for casual shoes is limited because the removable devices have to be put on the footwear and then take to be taken off (for example, when entering the room). As for fixed devices user should activate or deactivate them when needed. Therefore, it is reasonable to develop the appropriate relief of running sole surface with antislip properties for casual winter footwear. There are relatively few such running sole's surface structures [6], besides their antislip properties are insufficient.

At this paper we consider the running sole's surface, consisting of well-known antislipping elements and the elements have been developed by authors. These elements are particularly arranged and placed at the running surface to provide increased antislip properties of soles [7]. The figure shows one of the following anti-slip running sole's relief. Many casual (as well as sports and touristic) winter footwear soles have so-called protectors, with small corrugated supporting surface. At the proposed design of antislip relief the protectors form closed cuvettes 1, divided by grooves 4. The cuvettes can have different dimensions and shape that determine the design of running surface relief. The round rods 11 with a diameter 1.5-2.0 mm were arranged in staggered order in the cuvettes and were made flush with the supporting protectors surface (see figure a,b).

The groups of cuvettes are framed by borders 2 and 3 separated by grooves 5 and 6 at the toe and waist parts as well as the border of the heel. The surface of the small corrugated borders at the toe and heel parts is extended and there are crescent-shaped hollows 7 and 8 in this area. At the same time the sides of the protectors, borders and hollows have V-shaped grooves 10, 12, 13, 14 and 15 (see figure b, c).

Let's consider the antislip properties of these elements of the running soles reliefs. First of all, it should be noted that the surface of pavements and roads (asphalt, paving tile, etc.) have bump and potholes. They can be both large enough (height of the protrusion, h > 1,0 mm) and small (h<1,0 mm), and the number of small protrusions significantly greater than larges one [8] on any surface.

The breaking effect of the soles protectors is well-known from the walking process on the slippery supporting bearing surface. It is less known that the effectiveness of protector breaking actions significantly depends on the height of ground protrusion. The experiments have shown that large ground protrusions cause significant breaking effect due to the engaging edge and corrugated protector surface when samples of running sole's surface slip on the ground. Small protrusions practically don't interact with protectors and their multiplicity reduces

the real contact area of the running surface with ground. As a result, small protrusions in a contact with protectors cause a little breaking effect on don't have it at all [9].

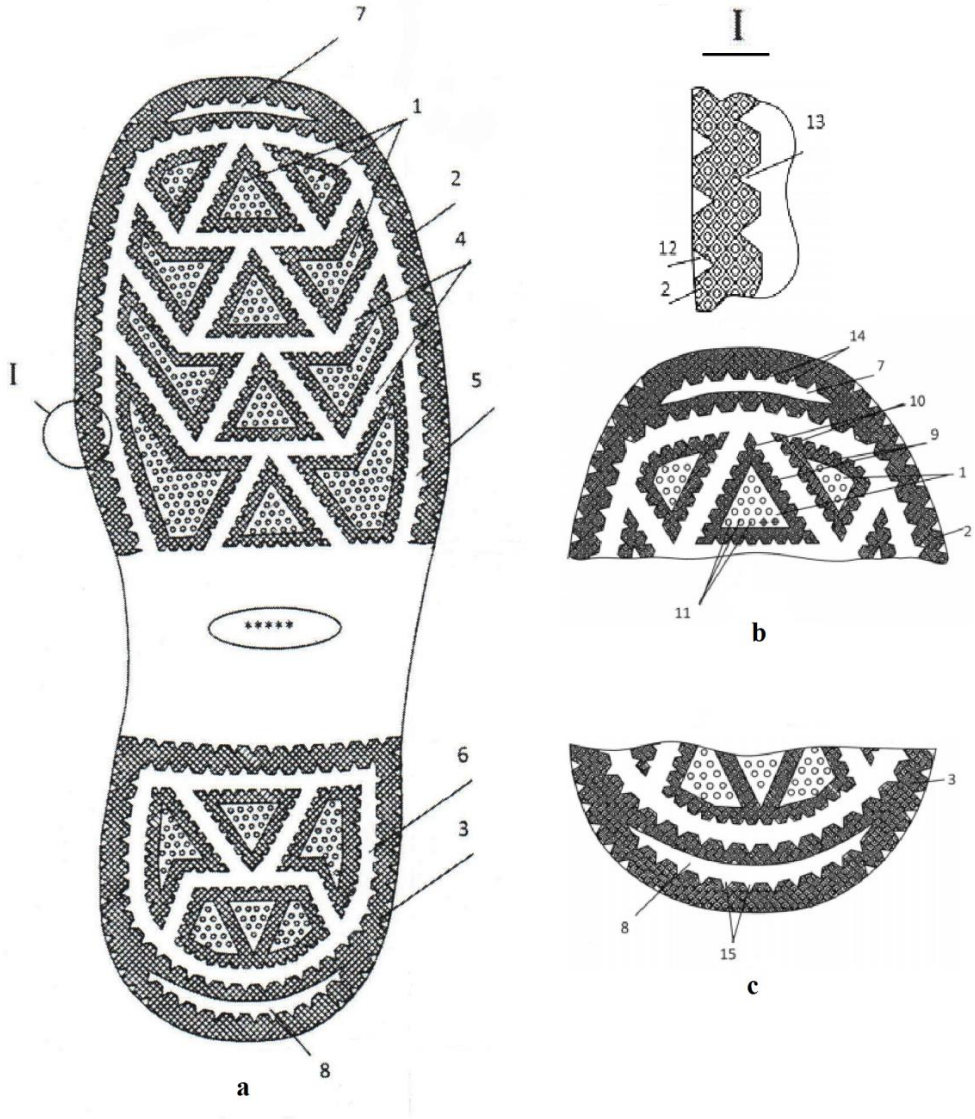

Figure 1 - Running surface of the soles.
a – general view; I– border; b, c - fragments of relief in the toe and heel portions, respectively.

In order to increase the breaking action of the numerous small protrusion we have suggested to perform flexible bars on the running sole surface. The bars can engage with large and small protrusions. These antislip elements are to be arranged in staggered order (see figure) to increase probability of engagement with ground protrusions.

A distinctive feature of the suggested running surface relief structure is the presence of crescent-shaped hollows 7 and 8, V-shaped grooves on the side of borders 2 and 3, protectors 9 and aforementioned hollows at the toe and heel parts (see figure b,c) . The purpose of the grooves is "jamming" of the engaged supporting surface protrusions that leads to a high increase of breaking effects. Figuratively speaking, hollows are the traps for the protrusions of ground surface and they are capable to prevent or reduce the effect of sliding soles while walking on slippery ground.

During the walk on the slippery surface, including ice-covered, footwear slip is possible in any directions and at any phase of the step. However it is the most dangerous and lead to the fall at the first and final phases of step. At the first phase (the phase of making step at the back side of the heel) the sliding of footwear is more likely towards to the direction of movement and at the final step (the phase of pushing off and lifting the sole toe part off

the bearing surface) – in the opposite direction [10]. Therefore to create conditions for "jamming" of the protrusions supporting surface the points of the V-shaped grooves, located in the crescent-shaped hollows 8 are directed to the edge of the heel but in the crescent- shaped hollows 7 they are directed to the front of the sole (see figure). As regards to the grooves on the sides of the protectors and borders they are arranged in different directions. Nevertheless their significant part is focused for prevention of slipping sole along the movement's direction.

Let's note two additional features of the relief element arrangement to increase the antislipping sole properties.

The first feature regards to the cuvettes form and their arrangement on the running surface. This aspect due to the availiability large-scale order protrusions (h>>1.0 mm) on the support surface. They are in contact with soles will most likely turn out into cuvettes while deforming the flexible rods. When sliding of the sole such protrusions run into the side of cuvettes and are able to "jamming" in it. To increase of "jamming" protrusions the sharp corners of cuvettes are located into the toe part and they are directed mainly to the front edge of the sole. The sharp corners of the heel parts cuvettes – to the falling edge of the heel. The arrangement of the cuvettes increases breaking effects for running sole surface at the first and final steps by walking on the ground with large protrusions.

The second features of the antislip elements arrangement apply to the hollows configuration between cuvette's walls. During sliding soles on the support surface in any directions the comparatives shift of the ground protrusions along the hollows are limited the rectilinear length parts of the hollows. Let's explain, that this distance is limited bi size of the sides cuvettes (see Figure). Therefore during sliding sole the relative moment of the ground protrusions are likely only a rectilinear part of the hollows, and further they run into the protectors or borders. They are able to get into the grooves. It is increase common breaking effects of the running surface.

The estimate of the breaking effects considering elements of antislip running surface are carried out according to the GOST 12.4.083 – 80. The samples of the thermoelastomer soles with dimensions 50x50x10 mm were made. There were four kind of samples: the samples with rectangular cuvettes, the samples with the same cuvettes with a bars inside them, smooth samples with grooves on the flank and smooth without antislip elements (reference samples). The experiments were carried out by means of updated laboratory bench, equipped thermostatic cell for provision with negative temperature and with sliding friction force recording attachment [11]. At the same time the sliding frictions coefficients of the mentioned sample groups on the ice-covered surface of asphalt, paving tile and on the ice at the temperature of -10...-12 C were determined. The experiment's result are presented in the table.

Table 1

The coefficient of sliding friction for the saples of the running sole's surface on the supporting surface.

Sliding surface	Coefficient of sliding friction		
	on ice-covering surface		on ice
	asphalt	paving tile	
Smooth (without antislip elements)	0,130	0,115	0,073
Smooth with grooves on the flank	0,164 (26,2)*	0,138 (20,0)*	0,082 (12,3)*
With protectors making cuvettes (without protrusions)	0,183 (40,8)*	0,145 (26,1)*	0,096 (31,5)*
With protectors and protrusions inside cuvettes	0,238 (30,1)**	0,176 (21,4)**	0,116 (20,8)**

Note: *The percentage shows the increacing factor over factor for samples with smooth supporting surface (*) and comprising protectors without protrusions (**).*

Out of the table it's follows that examined anti-slip elements have considerably breaking effects for sliding soles on support surface. At the same time combined breaking effects of running sole's surface numerous elements make sure to considerable antislip effects when walking on slippery surfaces.

LLC "Obuv Rossii" (Novosibirsk) manufactured a lot of soles with presented running surface relief for winter man's shoes. Experimental using were organized and all users noted perfect antislip characterictics of the using shoes.

References:

1. (2016) Zimohody Artimate. Available: http://www.artimate.ru/ (Accessed: 10.05.2016)
2. (2016) Zashchitnaya odezhda i spetsyalnoe snaryazhenie: prisposobleniya dlya khodby – zimohody. Available: http://www.ecomed.ru/catalog/228/300/ (Accessed: 10.05.2016)
3. (2016) Nakleyki na podoshvu – spasenie ot gololeda. Available: http://www.obuv-kosmetika.ru/shop/articles/naklejki_na_podoshvu.html (Accessed: 10.05.2016)
4. Zhelobitskij LE, et al. (2011) *Device to prevent falling in case of ice-covered ground*. Patent RF, no. 2412629, 2011 (in Russian)
5. Konev AN, et al. (2010) *Anti-skidding facility for shoes (versions)*. Patent RF, no. 2401624, 2010 (in Russian)
6. Nesterenko GN, et al. (1996) The combined layer of snow chains for shoe soles "ascolese-2". Patent RF, no. 2066967, 1996(in Russian)
7. Karabanov PS, Ivanova GA, Titov AM, Chalykh AS (2014) Walk surface with antiskid properties. Patent RF, no. 2519944, 2014(in Russian)
8. Nemchinov VM (1985) Stsepnye kachestva dorozhnykh pokrytiy i bezopasnost dvizheniya avtomobiley. Moscow, Transport Publ., 1985. 231 p.
9. Karabanov PS, Roslyakov AD, Titov AM (2015) Povyshenie antiskolzyshchikh svoystv khodovoy poverkhnosti podoshv povsednevnoy obuvi. Trudy MGUDT “Tekhnologii i materialy v proizvodstve innovazionnykh potrebitelsrikh tovarov ”. Chast 2. 2015. 192 p.
10. Mikheeva EY, Belyaev LS (1984) Sovremennye metody otsenki kachestva obuvi i obuvnykh materialov. Moscow, Legkaya i pishchevaya promyshlennost Publ., 1984. 248 p.
11. Belichenko KA, Karabanov PS, Koshurnikova OV, Yudakov DA (2011) Eksperimentalny stend dlya issledovaniya pokazateleya treniya skolzheniya khodovoy poverkhnosti podoshv po gruntu. Trudy Shakhty: FGBOU VPO “YURGES” “Tekhnicheskoe regulirovanie: bazovaya ozenka kachestva materialov, tovarov i uslug. 2011. pp. 110-111

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SECTION 29. Literature. Folklore. Translation Studies.

PROBLEMS OF NEW HERO IN M. GORKY'S NARRATIVES "FOMA GORDEYEV" AND "THE THREE"

Abstract: *This article analyzes the problems of a new character in the novels of Gorky «Thomas Gordeyev» and «Three». Reading these works, the readers offer a rich and diverse picture of Russian life, the world of the Russian bourgeoisie - from the lack of culture, and open to predation westernized forms of capitalism. This devout, OT Hanani Izuru, grown rich through crime and money-grubber philosopher Yakov Malenin, a person who is already able to think more widely, he feels politically sharpened and value in its class. The plot is based on the works of Gorky opposition of two ideas, one of which carries the idea of freedom, truth and power. And the other opposes it, the plot itself is denied as an invalid. Free and powerful people in the majority compared with birds, «the ability to soar» as opposed to those whose destiny crawling on the ground and grovel.*

Key words: *M. Gorky, searches of the hero, the story, Russian literature.*

Language: *English*

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From Gorky's narrative "Foma Gordeyev" [1899] starts a new stage of his search for hero. M. Gorky, in his letter to S. Dorovatovski expressed the idea of his narrative, in which he wrote about his desire to depict "wide meaningful picture of contemporaneity" on the ground of a man "who must be energetic, healthy man, looking for a job fitting to his power, looking for a space for his energy [3, XXVIII, p.62-63]. Such a hero must be Foma Gordeyev, a new ruler from merchant class, "who was thought to be a Titan, shattering the worldwide injustice [1, p.165]. However, he appeared to be not typical for his estate and for his time. He alone rose against the whole world and was defeated, but the young bourgeoisie in the person of merchant class was flourishing and was stronger than the person fighting alone. Foma had neither support nor accomplice; even he had no firm ground under his feet, nor practical, life ideal in his soul. He had all in all hatred in his heart against all the evil of the merchant class world.

Moreover Foma Gordeyev is a new type of hero in the creation of M. Gorky in 90ies. Foma is the first hero of Gorky who rose not against a separately-taken person, as for eg. Aristid Kuvald [Бывшые люди – Former People], directing all his hatred against the merchant Petunnikov, or Kain ("Kain and Artyom") rising against his insulters, but against the whole mercantile world, against the whole system. But this is another matter of things, that he was alone and powerless in his protest, and he had no idea of what to begin with, even he did not think to begin a certain systematic fight against the hated world. But the good point in him was that he did not perceive that world which was founded on injustice and mysteries, dirty crimes, the world to which he himself belonged.

Vice of the world, as a rule, first of all are seen by the leaders and humane representatives of the same world, the thing which happened with the hostility of the royal world, who in literature were called "unnecessary people". Protest of both of the "unnecessary people" and Foma derives not from the social, objects of daily life, but he derives from the morel enmity of this world. As V. A. Keldish noted, "For Gorky and the writers before revolution, the theme of resistance of environment, forestlands as incompatible antagonism between the environment and the inner world of the person, between him and his nature" [4, p.435]. Just this "nature of Foma Gordeyev could not put up with the fact, what happened around him, in his native merchant class world. That's why whatever they spoke or wrote against Foma Gordeyev, against his weakness and

senselessness of his fight, in spite of all this, he was a new hero, he was the beginner of the fight against all the system of unjust life. The following heroes of Gorky will know about the object and way of their fight and in their fight they will go further than Foma Gordeyev.

On the publication and appearance of the narrative "Foma Gordeyev" it arouses great interest to itself in the periodical press, and there appeared many critical reviews mainly against the main hero of the narrative. For eg. N. Kaspiyskiy saw in Foma Gordeyev "a type of pure Russian hooligan", in vain surrounded by Gorky "the eagle of self belonging pure Russian titans" [7, p.432]. Another critic A. I. Bogdanovich approaching more favorably to the protest of Foma, noted that "this is personification of the protest of the best power of human being against the reigning banality and lulling silence of standstill life [7, p.432].

The critic of "Moscovskiy vedomostey" A.Basargin generally considered that Foma does not deserve to be called as the hero of the narrative, it might be better to name the narrative as "Yakov Mayakin". In the face of antipode Foma, critic saw Yakov Mayakin as typical representative of merchant class having woken "hitherto as if dreaming self-consciousness of basically, sought for Russian merchant class" [7, p.433]. And after all enmity to the new hero of Gorky came from M.Chunosova, who called Foma as "Pitiful monster of mankind": [7, p.433].

In the soviet literature study of character of Forma was not highly valued either. It paid more attention to the episodically characters of workers, seeing in them inclination to future hero-fighters of Gorky and on the character of the main hero it was noted as "romantic illusion of Foma is diluted with the prose of bourgeois reality" [5, p.42]. A.Ovcharenko too, focuses his attention on the main hero, but on the characters of workers, who create before everything ground, but not the main plan of the novel. "In the quality of positive powers, he notes, determining fate of the country, fate of each person, in the narrative" by the character of Foma working people are confirmed" [6, p.110, 111].

The authors of "Russian Literature of the XX century" are true in mentioning that the narrative "Foma Gordeyev" in the first plan, the moral problem has been put forth.

The writer points out that "true humanistic beginning contradicts hypocrisy, false and obviously cynical moral of capitalists" [8, p.44].

Character and fight of Foma in reality is determined morally but not socially. His fight against the world of merchant class is conditioned not by life, by social necessity as a fight for existence but as a fight conditioned by moral requirements of soul and humane nature of hero. The hero as a human being is morally higher, won't accept non-humanistic and criminal principles with which merchants live. The defeat of Foma lies just in this, just in this lies his tragedy, being a merchant, he rises against his own class. Merchant class world is refused within itself, by the representative of the merchant class itself. That's why such a fight is doomed to failure. This is the defeat of morals, purely humane principles and values before the iron principles of merchant class world, the principle which is determined by Yakov Mayakin like this: "The life of brother Foma is introduced very simply: either all is in dirt or lies in dirt…" [2, III, p. 89].

Why Gorky compared the world of merchants with its own representative, but not with the representative of any other estate, let's say, with intelligentsia or with lower middle class? It seems he did this for the reason that the writer had to point out not much of class, social fight, but he had to point out more moral damage and not fitfulness of merchant class. Class enemy is absolutely different from the moral enemy: merchant class with its principles is hostile not only to the working people, but also to the whole mankind, to the whole sound beginning. In the narrative "Foma Gordeyev, M.Gorky did not fully reveal the class determination of character and fight of his positive hero.

Different from his father Ignat Gordeyev who is a man of strong will, strong Foma is a man, though also strong, but seems to be of double nature, suspecting in the fact that he lives a correct life. In the formulation of his character on one hand, his father and his enterprise and on the other hand his aunt Anfisa and her tales made their influences. World of tales of Anfisa and real world of Ignorant created turmoil and disharmony in the soul of young Foma. Whatever Foma did, the work in his merchant enterprises and in his relations to women – in all he could remain pure pragmatic and merchant, in his activity and mutual relations with people, moral feelings are mixed up with. When Mayakin teaches him, how simply and roughly it is necessary to treat woman, Foma tells him: "Heart – a person possesses a hear!..." [2, III, p. 94]. The young man with his inexperienced mind searches for the sense of life, but can't find it, for which he is angry at people and at him-himself, considers them and himself unnecessary for the society. The questions how to live, what is the sense of life and what the sense of human life torture him. "River flows for the reason that people sail on it – he says, - a tree grows for the use of people, a dog-guards the house… All in life can be justified! But people – as cockroaches are quite unnecessary on the earth… All is for them but what are they for? In what is their justification?" [2, III, p.146]

Tragedy of Foma lies in the fact that he cannot make out the complicated problems of life, find his place and his appointment in it. Life seems to him to be just cruel and ruthless process. It is as a mill, but

people are as corns, dropping under millstone they turn to flour. In this elusive process, called life, Foma can not make out the notion which is called the sense of life – management, money, trading etc., for Foma all this is a heavy burden from which he wants to emancipate. Foma somehow very early and very quickly gets upset in his life and his estate.

It is interesting to know why Gorky in the quality of such a merchant chose the man, being not experienced in the problems of living, even an unread man, not having read any book on merchant business. It is obvious that Gorky wanted to show that moral look of his hero was formulated not on the basis of clear bookish pieces of knowledge, modern theories, but on the basis of just the real life itself and natural inclinations of human nature.

Foma's soul is not distorted and is not spoiled by some strangers, by bookish, scientific impacts. His soul preserved its infantile purity and the born with him kindness, and he won't accepts the life as it is, the things which happen around him.

Foma's protest against the merchants and against the merchant world bears roughly-spontaneous character and is expressed in rough critic and square curses. It is true, that one of the merchants, "a grey-haired old man" addressing to the merchants says: "It is from the honor of word! It is nonsense! It is necessary to endure… prophetical accusation… they are sinful, aren't they… Isn't it necessary to tell the truth, we are very, very…" [2, IV, p.217] But these "prophetical accusations" of Foma are expressed in the form of severe hatred to these double – faced and dangerous merchants. Alongside the honour in Foma spoke a great power and courage to tell them in the face all their falsehood. He prophited them not on the social matter of things, not the humanistic matter of things but Godly punishment. All these people, as to Foma's understanding are great sinners and they are all guilty before God.

Foma's hatred and his protest doesn't possess a hard basis in his soul and in his mind in the form of a certain ideal. He has no positive imagination about this ideal and on the other life. He has got only the sense of injustice, of which he spoke and as if calmed down his hatred. "He, with tiredness of struggle, powerless shame of defeat lay silently, furiously angry, smothered in dirt of something, tightly tied up on the hands and feet with a towel… something burned in him and it became darker, emptier in his soul" [2, IV, p.218].

Foma understood and admitted his defeat and he didn't expect more from this struggle. He only wanted to tell the truth… wanted to ease himself" his "head painted", he "felt the truth" [2, IV, p.p.220-221]. He says to Yakov Mayakin: "And by all means you are guilty! You spoiled. You spoiled the life!... But though my truth against you is weaker, but still it is truth! You are damned! Let you all be damned… [2, IV, p.221] Against the possessed easy money, Foma opposed the possession of truth and it turned to be weaker than the system.

Possession of thirst for easy money and carelessness to all moral duties before God and people excites the soul of Foma and pours them all his hatred in the face, and while doing this, he is in the powerless, desperate despair, as if he is in a nightmare. His struggle appears to be if not weaker but at any case, the struggle of a man being powerless before this world.

It is not occasional, that L.Tolstoy's narratives "resurrection" and "Foma Gordeyev" written by M.Gorky appeared by the end of the 90^{ies} of the XIX century. In one case we see the completion but in the other the beginning of search for true hero. Tolstoy's Nekhludov found the truth, which was an old truth, but Gorky's Gordeyev did not find it, or he looked for a new truth. But Gorky's hero had something of truth, from which he acted, and which can be called as precursor of future truth for which other heroes of Gorky will long for. In this sense, just lies the plan of search for new form of truth and the new novel of Gorky "The three" can be considered as the continuation of the narrative "Foma Gordeyev".

Narrative "The three" was written at the beginning of the XIX century, in 1900-1901 years and can be called as a new stage in the search for heroes in the creative activity of Gorky. If Foma Gordeyev in his hostility to the existing order falls into the list of the unsatisfied with life, we can say, the people beaten off by the very merchant class itself, but Ilya Lunev falls into the list of people rising from below and up stands against them with the same reason as of Foma Gordeyev. In Gorky's both heroes the protest against the unjust world is conditioned not by their social position, but it is conditioned by the moral state of their souls. In the both cases natural, humane beginnings won't accept social beginning, the soul of man can't agree with the injustice, lawlessness, inhumanity which takes place in life.

"The main problem of narrative – as the authors note, of the Russian literature of the XX century" – is a choice of "the way of life" [8, p.49], though it might be exactly said that it was not a choice but poignant search of "the way of life", or fight and tragic death of Lunev, it is difficult to call the choice of "the way of life". Before everything it could be said about the possibilities of choice and despair which brought the hero to suicide.

E.B.Tager noting the continuing link between the narratives "Foma Gordeyev" and "The three" and the "early stories of Gorky" determined their themes as "the theme of tragic struggle of personality for the right to life and happiness, for the right to human dignity" [9, p.240].

In the context of investigated by us the problem, it is worth mentioning that the heroes of the first big-volume works of Gorky including the

narrative "The three" searched for, before everything, the sense and appointment in life. They understood life and happiness not as the growing merchants and buyers did, that is, they saw happiness not in the form of material prosperity and in richness, but in doing kindness and in active service to the others. Ilya Lunev with all his power achieved all; from the begging orphanage he entered the list of merchants. But he found no sense in hoarding and in gathering wealth.

So, Gorky's hero does not search for his personal prosperity and maturity but he searches for activity which brings prosperity not only for himself, but for the others. But Ilya could not find such kind of activity and that's why died tragically. In the "search for decent life", Lunev fell into the world of falsehood and hypocrisy, self-interest, scandalous injustice" [8, p. 49]. His protest against Poluetkov, and then against his companion Avtonomova – in its essence was a protest against to himself, as the life of a merchant and a purchaser, can't be called "decent". His suicide was the continuation and logical final of his hatred to Petrukh Filimonov, the death of money-changer Poluetkov and, at last, the publicly exposure of the guests and the family of the Antonius. Hatred to the mean ideals embraced him himself into its orbit as well which became the reason of his endless despair and suicide. Both in murdering and in suicide, one and the same idea was expressed – the idea of hostility to the existing order of life.

The investigators many a time mentioned the roll-call of the themes of the narratives written by Gorky and moral suffering of his heroes with the themes and heroes of works written by L.Tolstoy's and F.Dostoyevski, particularly with the novel "Crime and punishment" written by Dostoyevsky. The theme of search for the way of life and moral sufferings of the heroes of Gorky and his predecessors coincide something in common. As one of the investigators of Gorky noted, the young writer "not only praised this theme among his predecessors, but untwisted it, informed of its tensity never having been before" [9, p.240]. The essence of its tensity lies in the fact that Gorky searched for the solution of the problem of the hero and the society not in the moral-psychological aspect, in the way Tolstoy and Dostoyevsky did, but he searched for the solution of the problem in the practical activity and struggle, the ways of which were not yet known either to the writer himself or to his hero.

The search of young Gorky and his heroes went on in two directions: first of all in the direction of search for the power and for the enemy against which and against who it was worth fighting; secondly, in the search of the heroes themselves, the heroes with which mental and willful qualities must this new hero possess. Neither Foma Gordeyev, nor Ilya Lunev knew in what the root of evelty is and against what and how they had to fight. That's why their fight was doomed to failure on two reasons: the first: they did not yet determine the root and initial reason of evil which embraced the whole modern world: secondly – these heroes are not ready themselves to the systematic practical struggle against this evil. Their struggle is of too much abstract character: neither the aim, nor the means of struggle are clear to them.

Ilya Lunev knew and could not help knowing that it was of no use telling his girl companion and her guest's bitter reprimands for their false and dishonest life in the face and while doing this, he openly declares that he murdered Polutkov. What does it mean? What for? With what, purpose? Firstly, this is the endless state of the hero, who in the search of the way of life and for the aim of his existence, entered a dead – end from which he does not see a way out, and that is why he is in despair. Secondly, all this has been done for the objection of soul, for the suppression and satisfaction of his hatred to this world, for these by appearance seemingly prosperous and happy people, being in bliss in their moor of dishonesty and falsehood. Under the feet of this dirty life only Ilya Lunev is visible, but these people themselves don't see its abnormality, as the worms of the moor don't see dirt around their lives. Thirdly, it is as to the chance of aim of Ilya Lune's protest, - a concrete aim and programmers of activity he did not possess. Coming to the Antonovs as a guest, he did not know that he would protest and burn all the bridges behind him. He did not know either that by calling at Poluetkov he would kill him. In all cases he acts with the possessed by him the hatred and passion for action. They are ruled over by emotions, but not by wit, or the latter was powerless to solve all the puzzles, which the life put before him. That's why his actions were ruled over and directed by the momentarily appearing in him emotions, born with severe hatred to this world and with consciousness of his powerlessness before them. For seemingly senseless actions of Ilya, however one can find such a justification: with his thoughts and soul he could not put up with shameful and unjust world.

The merchant Poluetkov and tavern-keeper Peter Filimonov, who personify this world, are just the bearers of his moral. Ilya easily manages and unpunished in the way as he lawlessly killed the first and beat the second. He does not know that the roots of evil are not in them, but are hidden rather deeply, than the amoral and grasping passion of these people, and that's why it is impossible to determine the reasons of this evil and kill all its bearers. Ilya's sense of struggle against all the bearers of evil and against the society of the Avtonoms in the birthday party of Tatyana lies in this – his girl-companion's struggle whose struggle is like Foma Gordeyev's struggle against merchant class. If Foma Gordeyev admitted his defeat after his riot and put up with it, Ilya goes till the end and being conscious of his

defeat, ends his life with suicide, striking his head against the wall.

This death of the hero is symbolic, else evil stood before him as insurmountable wall, which is hard to smash, how it is possible to strike the head and break it.

The advantage of Gorky's new hero before the precedetors lies in the advantage of Ilya Lunev over Foma Gordeyev indicating the fact that Ilya came from aside, from a poor family of a peasant. If Foma was born and grew up in a prosperous family of a merchant, Ilya Lunev was a poor orphan, came to the city from a village being still a small child and in an unknown city felt all the hardships of necessity and poverty. He with his own strength alone joined the people and became a beginning merchant. But as Foma, Ilya too could not put up with injustice and immorality of this world.

In this case Gorky as his precede or L.Tolstoy's considers a deep social problem in the moral aspect. The hero acts against social order deriving from moral motives of his human nature, but not deriving from his social unreasonableness. As a result of this, it appears that social contradictions deriving from moral criteria are impossible to solve. Perhaps, Gorky understands this, but the ways and means of solving social problems - even and real, practical ways of struggle for building up just social society are even not known to himself.

Both narratives – "Foma Gordeyev" and "The three" have been set up as the autobiographies of the main heroes, and in the both cases the works begin since the childhoods of the heroes and in the both cases the ways to their mental and moral formulation are observed. The autobiographical sense of the plot of the narratives written by Gorky is determined by E.B.Tager not as the description of the "history of formation of personality under complicated influence of the surrounding environment" [9, p.242] but as "ant humanistic and false moral" with which this world exists, excites the pure, human soul of the young hero.

The surrounding environment was determined by Gorky not so much as to the character of the hero, but much of his will for struggle. Describing the environment, Gorky wanted to underline its nonconformity to the human nature.

The law of this environment, its principles and understanding on the justice completely contradicts to the moral principles of the human soul. Participating in the court for prostitute Vera, by the way, which reminds us of the court on Katyusha Maslova from the novel of L.Tolstoy's "Resurrection", Ilya flies into a range by the fact that thieves and Villains, such as Petrukh Filimonov silently judge the thieves and villains. Tolstoy's scene of court was aimed at changing the fate of the main hero as the guilty person of the misfortune under the jurisdiction. But Ilya made two impressions from this court – in the tragedy of such people as Vera, the life itself is guilty, the system itself is guilty, in which thieves judge the thieves. That's why if the struggle of Tolstoy's hero was directed against the hero himself, but the hatred and struggle of Gorky's hero was directed against the society.

But it is parodoxal that the victim of this opposition of society and the hero become hero in the face of Ilya Lunev. If Dmitry Nekhludov new what to do and against whom to fight, but Ilya Lunev does not know against whom to struggle and how to do it, or his enemy was elusive and almighty. Against such an enemy adequate social power was demanded on which Gorky will speak in his following works.

References:

1. Basinskiy PV (2005) Gor'kiy. M.: Molodaya gvardiya, 2005, 451 p.
2. Gor'kiy AM (1960) Sobranie sochineniy v 18-ti tomakh. Moscow: GIKhL, 1960-1963.
3. Gor'kiy AM (1949) Sobranie sochineniy v 30-ti tomakh. Moscow: GIKhL, 1949-1955.
4. Keldysh VA (1971) Realisticheskie techenie predrevolyutsionnykh let // Russkaya literatura kontsa XIX – nachala XX v. 1901-1907. Moscow: Nauka, 1971, pp.127-176.
5. Mikhaylovskiy BV, Tager E (1969) Tvorchestvo M.Gor'kogo. Moscow: Prosveshchenie, 1969, 336 p.
6. Ovcharenko AI (1956) O polozhitel'nom geroe v tvorchestve Gor'kogo [1892-1907]. Moscow: Sovetskiy pisatel', 1956, 586 p.
7. Petrova MG (1968) Letopis' literaturnykh sobytiy. 1892-1900 gody // Russkaya literatura kontsa XIX – nachala XX v. Devyanostye gody. Moscow: Nauka, 1968, pp.261-478.
8. (1985) Russkaya literatura KhKh veka. Dooktyabr'skiy period. L.: Prosveshchenie, 1985, 334 p.
9. Tager EB (1968) Revolyutsionnyy romantizm Gor'kogo // Russkaya literatura kontsa XIX – nachala XX v. Devyanostye gody. Moscow: Nauka, 1968, pp.213-243.

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SECTION 13. Geography. History. Oceanology. Meteorology.

THE PARTICIPATION UZBEKISTAN AND AZERBAIJAN WITHIN THE FRAMEWORK OF PROJECT TRACECA

Abstract: *In this article it is given brief information about the origin and development of TRACECA, corridor of Eurasia, as well as the role and importance of economic and cultural relationship among countries which are situated along the Great Silk Road. Within the framework of this project a special place is given to the cooperation of Azerbaijan and Uzbekistan. Due to the participation of the two countries to roads` rehabilitation of the Great Silk Road, the work on reconstruction of motor and railway roads and other traffic communications, and also of their infrastructure is held in the republics. The article also includes the examples of efficient and successful cooperation between the two countries.*

Key words: *Azerbaijan, Uzbekistan, Caucasus, Central Asia, Great Silk Road, the East, the West, civilization,TRACECA.*

Language: *English*

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In 1991, after disintegration of the USSR, European Alliance has prepared a new, special program TASIS on undertaking the functioning, in particular, the realization of the democratic reforms in independent states, create the infrastructures of market economy, the development of interstate trade, transport, network customs - admission points. Within the framework of exactly this program in 1993 in Brussels "Transcaucasia transport corridor Europe-Caucasus-Asia" project was brought forth on the initiative of European Union (TRACECA) [Gasanov, 2007, p. 601].

As it is well known, in May, 1993 TRACECA was created at the participation of 8 countries: Azerbaijan, Armenia, Georgia, Kazakhstan, Kirgizstan, Tadzhikistan, Turkmenistan and Uzbekistan. Later, during the period from 1996 till 1998 the Ukraine, Mongolia and Moldova were joined to the project. In 2000 Turkey, Romania and Bulgaria were joined to the project. In 2009 Iran was joined to the project, but Lithuania has got the status of the observer in the intergovernmental commission of the organizations.

TRACECA (Transport Corridor Europe Caucasus Asia) is a single project of Euro-Asian transport corridor on the West- East direction from Europe, with intersection of the Black Sea, through Caucasus and the Caspian Sea with output on Central Asia, which got significant financial, organizational and technical support of the international structures, in the first place of European Union. It corresponds to the global strategy of EU on rendering the assistance to political and economic independence of Central Asian and South Caucasus states by increasing the possibility of their yield on European and world market through alternative transport corridors. Finally TRACECA contacts with Trans-European Networks (TENs).

Besides, the support of the corridor pursues the purpose to provide guaranteed, steady output of Caspian and under Caspian power resource on international market. Annual financing of TRACECA project by EU forms 9-11 mln. Euro. The TRACECA corridor is aptly located between the main commodity producer in Asia and users in Europe and, besides, this route is more than two times shorter on the main transoceanic direction from the ports of Japan to the largest ports of West Europe.

The main purposes of the project are: creating the alternative to Russian Trans-Siberian pathway; the joining of the region to European transport networks; the support of CIS' (the Commonwealth of independent states) new states independence

[http://www.transcaspian.az]; the fortification of cooperation between the republics in questions of the trade development in the region; the assistance of Central Asia – Trans Caucasus - Europe corridor development; the determination of the problems and defects in the systems of trade and transport in the region; the determination within the framework of contents and periods of the technical assistance realization program, budgeted by European Union [EVROPEYSKIY..., p. 4].

TRACECA project provided the creation of system collection of railway, car, water and air pathways, which would connect two final points with the most short complexion : Druzhba (Friendship) station on Kazakhstan-Chinese border and Georgian Batumi port with two parallel corridors: Shymkent - Tashkent - Samarkand - Bayram- Ali- Ashgabad - Turkmenbashi - Baku and Shymken - Aktyubinsk - Makat- Aktau - Baku [Mirzaev, 2004, p. 187].

Today, this transport route comprises train-ferries between the ports of the west seaside of the Black Sea and Georgia, a modernized Trans-Caucasian railway and car roads parallel to her, train-ferries – Baku - Turkmenbashi and Baku - Aktau with eight ferries, modernized Central Asian railway Turkmenbashi - Ashgabad - Tashkent - Almaty - Chinese border and the road of Aktau - Central Kazakhstan - Chinese border, Aktau -North Kazakhstan - Russia, as well as car roads of the latitudinal direction [Fedotova, 2004].

At the present time TRACECA has 64 terminated and 6 current projects on technical assistance, in each of which at the minimum, 10 countries-participants are involved:

The International projects of the transport corridor development are:

1) TRACECA Project on Safety of the road transport II (car roads);

2) Transport dialogue and interaction of the networks II (multimodal transportation);

3) Sea protection and safety II;

4) Project on civil aviation II;

5) Project on Safety of the civil aviation;

6) Regional project of TRACECA -LOGMOS - Logistical processes and sea pathways II (multimodal transportations) [Turaeva, 2014, p. 18].

The list of terminated project comprises projects of technical help, concerning development of all types of transportation, education of branch department employee, different TEO development, support, rehabilitation and construction of the roads, introduction of the managerial systems and national legislation change.

The main achievement of TRACECA is the main many-side agreement (MMA) about the international transport on the development of "Europe - Caucasus - Asia" transport corridor, which was signed in Baku in 1998. Apart from MMA, the states, participating in TRACECA, had also taken a number of protocols and technical applications, presenting the change and additions to the given to agreement. Among them it is possible to note the Protocol about contributing changes to MMA, approved on II annual meeting in Tashkent, including the following positions: about railway invoice; about using zero rate VAT on railway facilities and none-using customs deposit; about bank provision; about policy of financial risks insurance and ensuring of the goods transit by rail-freight traffics.

The important action in the development of the transport corridor is the creation of the Coordinating committee on the development of Trans-Caspian international transport route at the participation of railway and port administration and shipping companies of Kazakhstan, Azerbaijan, Georgia and Turkey in February, 2014. Its purpose is the increasing the route attractiveness at the expense of the interaction of the sides in removal of physical and none-physical barriers and coordinated competitive tariff policy conduction [Transport corridors, 2015, p. 38].

One of the main stages of the recovering the transcontinental route are Serakhs Agreement and the Agreement between the Republic of Azerbaijan, Sinker, Turkmenistan and the Republic of Uzbekistan about the forming of communicational Trans-Caucasus corridor, signed in May, 1996.

The Serious achievement in the development of international transport corridors is the introduction to action of Tedzhen-Serahs-Meshhed pathway under active participation of Uzbekistan railway on May 12, 1996, extending 320 km, which has opened new Trans-Asian corridor for the yield of Central Asian countries on the world market through the territories of Iran and Turkey. In the same year in Serahs the leaders of Uzbekistan, Azerbaijan, Georgia and Turkmenistan have signed "The Agreement on the co-ordination of activity of the rail-freight traffic" and "The Agreement on cooperation in the field of regulations of transit transportation between countries-participants" [http://www.uzyt.uz/index].

The Trans-Caucasus corridor (in transit through Turkmenistan, Kazakhstan and Azerbaijan), with output to the Black Sea is known as TRACECA corridor. According to preliminary estimates of analysts, the realization of the project will allow Uzbekistan to spare annually around 20 mln USA dollars only on the export of cotton filament. As to economic advantages the opening of the new pathway allows Uzbekistan to shorten the distance to ports of the Black Sea basin to 1500 kilometers in contrast with traditionally used "northern" routes. Today, the transportation of one ton of the cargo on TRACECA costs cheaper by 14-18 USA dollars than the former way through Russia.

For present day, the fact that Uzbekistan, having already put money into the reconstruction of the

Black Sea transshipment element, Poti port, which has 3 own storehouses there today, with the capacity of 30 thousand tons, tells in favour of this route.

This route is one of the the most real possibilities of Central Asian countries yield (including Uzbekistan) to the seaports on Tashkent-Chardzhou-Turkmenbashi- Baku -Poti (Batumi) route, as well as by the united system overland car and railway communications formed long ago, connecting the countries of Central Asian region and Transcaucasia with European continent.

Within the framework of this route the car road passes on the territory: Azerbaijan - 801 km; Georgia - 464 km; Uzbekistan - 662 km; Turkmenistan - 1212 km. On experts' evidence this car route has the first, the second and the third technical categories and allows skipping the transport facilities through traffic, at the term of the bridges' reconstructions and some area on the territories of Azerbaijan, Turkmenistan and Georgia.

The Railway route on Euro-Asian corridor, having its total extent of 3076 km, passes the territories: Azerbaijan (the Baku- Buyuk Helmet) - 511 km; Georgia (Buyuk Helmet- Port Poti) -363 km; Uzbekistan (Chingildy-Farab) - 761 km; Turkmenistan (Farab-Turkmenbashi) - 1 141 km. It should be mentioned that this railway pathway, having its enough high reception capacity about 40 pairs train a day, is well equipped and is partly electrified [http://refdb.ru/look/l 735317.html].

Besides the development of the two main trends: car and rail transportations, technical assistance in the development of the sea transportations turns out to be too. The investment projects on the development of the terminal infrastructures in the ports of Iliichevsk, Poti, Batumi, Turkmenbashi, Baku and Aktau have already been marketed as a result Varna-Iliichevsk-Poti-Batumi and Baku -Aktau regular train-ferry link has been opened. Simultaneously these ports are given necessary equipment for the realization of the cargo handlings, including the processing of containerized cargo.

One of the most important transport elements of Europe - Caucasus - Asia route on the Caspian Sea is Baku international seaport. It has several mechanized quays, which are specialized on processing of dry cargo and fluid courts, as well as on processing of ferry and heavy-load containers. At the expense of the grant the port has gained modern cargo-handling equipment for the amount of 2 mln. dollars [Mirzaev, 2004, p. 235] as a result of that an oil-cargo-port is delivered in usage, allowing unload-loading of 10 mln, oil-products per annum. Besides, some works on the reconstruction of Baku International Trade Port ferry terminal are held.

If in 1996 the volume of Uzbek export-import cargo transported on Trans-Caucasus corridor formed nearly 140 thousand tons, in 1997 it formed 285 thousand tons, and only within eight months of 1998 it exceed 240 thousand tons. With the operation of the route beginning only within the framework of cooperation with Uzbekistan on export-import operations 660 thousand tons of vitally important cargo on the amount of about 470 mln. USA dollars have been transported [Karimov, 1999, p. 172]. The Main transit cargos are oil products and cotton.

Azerbaijan and Uzbekistan consider questions of more efficient Trans Caucasus corridor use within the framework of TRACECA project, Europe-Caucasus-Asia route as an important factor for growing of the amount of business between the two countries [Gasanov, 2007, p. 737].

However, among all types of transport a special place for South Caucasus countries and Central Asia is occupied by the pipe lines, the main task of which is delivery of the power systems through the Caspian and the Black Sea in Europe. Today Turkmenistan is predicted the fate of Kuwait for great spares of oil and gas, Azerbaijan and Kazakhstan are numbered among the countries with great prospects, and Uzbekistan will be able to provide itself independence in power engineering even for a long time [Mirzaev, 2004, p. 159].

The pipe lines in the Caspian region are a powerful instrument of geopolitics. Baku - Supsa oil pipeline have been laid first on South-Caucasus corridor on April 17, 1999, at the participation of the President of the Republic of Azerbaijan, Geydar Aliev, the President of Georgia, Eduard Shevardnadze, and the President of the Ukraine, Leonid Kuchma, the ceremony of the exploitation of Baku - Supsa oil pipeline and Supsa terminal (located on the Chernomorsk seaside of Georgia) was held. Through Supsa port the export of Azerbaijan oil which was gained from "Chyrag" oil-field on the world market began [www.azerbaijan.az]. The Total extent of the oil pipeline is 850 km, the reception capacity is 5 million tons per annum [Guseynova, 2005, p. 228].

The Project of Baku - Tbilisi - Dzheyhan pipe line began to be realized after signing of the declaration on October 29, 1998 in Ankara. It has been signed by the President of Azerbaijan, Geydar Aliev, the President of Georgia, Eduard Shevardnadze, the President of Kazakhstan, Nursultan Nazarbaev, the President of Turkey, Suleiman Demirel, and the President of Uzbekistan, Islam Karimov, in witness of the minister of the USA power engineering, Bill Richardson [Baran, 2005, p. 106]. The extent of Baku - Tbilisi - Dzheyhan pipeline makes up 1768 kilometers. The oil pipeline passes through the territories of three countries: Azerbaijan (443 km), Georgia (249 km) and Turkey (1076 km). The reception capacity makes up 1,2 mln. barrels of oil a day. The Official ceremonial openning of the whole oil pipeline passed on July 13, 2006 in Dzheyhan. Since the moment of

the putting the oil pipeline into operation on June 4, 2006 and on condition at the end of June, 2013, altogether 2227 tankers were loaded in Dzheyhan port, i.e. on BTD 229 mln. tons of oil were got to the world markets. At present oil is pumped on BTD oil pipeline from the block of "Azeri-Chirag-Gyuneshli" oil-field and the condensate from "Shah-Deniz" oil-field [http://www wikipedia.org].

On June 16, 2006 Nursultan Nazarbaev signed the agreement on joining Kazakhstan to the project of the oil pipeline. The Agreement provides the organization of tanker transportation to Kazakhstan's oil from Aktau to Baku through the Caspian Sea and its further transportation on BTD oil pipeline. On the first stage Kazakhstan intends to load on BTD about 7,5-10 mln. tons of oil per annum.

It is interesting that on the ceremonies of the BTD's opening Nursultan Nazarbaev has elaborated that Dzheyhan direction will become for Kazakhstan only one of the export oil ways, but in no circumstances the main one. He founded his own discourses just on the forecasts of the mining of oil in the republic. "Astana keeps the many-side variant of its own hydrocarbon delivery to the world market, - he said. - And not because this is our ferroconcrete position, but simply because of that in 2010 we shall gain 100 mln., and till 2015 we shall gain about 150 mln. tons of oil. Under the internal need of our economy about 30 mln. tons neither BTD, nor North Caspian oil pipeline will be able to provide complete transportation of our oil abroad" [Zaslavskiy, 2005, p. 14].

The Significant place in transportation of power resources is conducted also to gas. South Caucasus gas-main, or in other words Baku- Tbilisi - Erzurum (BTE) Gas-main, was officially opened on March 25, 2007. The Diameter of the pipe line is 42 inches, extent makes up 970 km (442 km in Azerbaijan, 248 km in Georgia and 280 km from Georgian-Turkish border to Erzurum). On the South Caucasus gas-main the gas is pumped, which is gained within the framework of the first phase of "Shah-Denis" project [Transport..., 2015, p. 72-73].

Uzbekistan also takes part in dispatch of its own power resources to European countries, through BTD and BTE oil pipelines, using the ports of Kazakhstan and Turkmenistan, and from there goods are got to Azerbaijan and further to Europe through Turkey. For transportation of the cargo from Azerbaijan to Uzbekistan, the goods are sent from Baku port to Turkmenbashi port, from which they follow through Turkmenistan on a railway or a car road, further they reach Uzbekistan. There also exists an alternative way through Kazakh port Aktau, from which goods are delivered to Uzbekistan by land.

Besides oil and gas, different equipment, industrial and foodstuffs are also carried.

Within the framework of the corridor some steps are undertaken on shaping the mutually beneficial tariff terms for transportation of humanitarian cargo in Afghanistan, as well as the organizations of containerized transportation on Poti-Baku -Aktau- Almaty route with the prospect of their extension to China.

However, under the whole importance and intensities of Transcaucasia route, in 2008 the given route ceded a little to other alternative corridors: Trans-Russian and Trans-Turkish (Iranian) routes.

The time, cost, reliability, safety of the cargo have served as the criteria of comparison, moreover, the higher the importance of the index is, the more attractive the given route is. As any other index, its importance can be evaluated only in comparison with one another.

According to the results of this study the best indicator of transport routes attractiveness was given to Trans-Russian route -3414, Trans-Turkish one turned out to be on the second place according to this index 6646, and the third place was given to Trans Caucasus route with the index importance - 8258.

Table 1

The Comparison of the Index TRACECA of alternative routes.

Route	INDEX Significance	Way cost	Time cost	Reliability Cost	Safety cost
Trans Russian	3114	1685	6767	6373	137
Trans-Turkish	6646	3408	7776	8839	300
Trans-Caucasian	8258	3446	11243	10849	221

During the last years within the framework of TRACECA and in alternative fetter cooperation searches of new large-scale project are planned. One of them is NEACB (New European Asian Continental Bridge) project, being realized within the framework of TRACECA. The Interest to the project is exceedingly great all through the route from China to Turkey. The extent of this transport bridge is

10560 km, 3900 km of which pass through the territory of China, 1800 km pass through the foothills and plains of Kazakhstan, 700 km pass through Uzbekistan, 450 pass through Turkmenistan, 1960 km pass through Iran and 1750km pass through Turkey. Azerbaijan, Georgia and Armenia are also taken into account to be joined to the project [Mirzaev, 2004, p. 179].

From the very beginning NEACB assumed the construction of the railroad tracks network from Lianyungang coastal city through China to Kazakhstan and Iran and further on the tunnel under the Marble Sea (built in 2013) to Turkey for the reason of ensuring the steady train service between China and Europe. The New Eurasian continental bridge was to become the addendum to Trans-Siberian pathway, which already provides regular delivery of the cargo between China and Germany. The given project also comprises sea area, passing from China through the Indian Ocean [Transport corridors, 2015, p. 27].

The other project, which must become one of the main TRACECA's routes, is Baku - Tbilisi - Kars (BTK) railway. The agreement on its construction was signed in February, 2007 by the presidents of Azerbaijan, I. Aliev, Georgia, M. Saakashvili, and the Prime Minister of Turkey, R. Erdogan. The total extent of the railroad tracks will form 98 km, 68 km of which will go through Turkish territory and 30 km will go through Georgian territory.

Full operation of this train service is planned in the middle of 2016. On December 24, 2015 on Baku-Tbilisi-Kars (BTK) railway the test cargo train including five coaches, which went from Baku to Ahalkalaki station, was successfully started up. The peak reception capacity of the corridor will form 17 million tons of cargo per annum. On the initial stage this factor will be at the rate of one million passengers and 6,5 million tons of cargo [http://www.trend.az/business/economy/2475882.html].

To the operation of BTK the delivery into usage of Alyat port near Baku is also planned. At the same time Kazakhstan also plans to increase Aktau port, in which an additional ferry terminal will be built. The Improvement of ports on the Caspian Sea will bring even more productive cooperation of TRACECA's countries-participants.

TRACECA project "Silk Wind" also seems to be interesting and, directed on the extension of transit transportation by railway and sea fetter on the direction of China border - Kazakhstan - Georgia-Azerbaijan - west border of Turkey. The Participants of the project (Azerbaijan, Georgia, Kazakhstan and Turkey) plan to use the speed through cargo trains in multimodal transportation, to introduce the common tariff on cargo transportation, to simplify customs and border procedures, as well as to shorten the time of the transit and the time for transit.

Within the framework of Silk Wind project the extent and velocity of the transportation on Dostyk/Altynkoli - Kars route through Aktau and Baku ports will practically decrease by 25% (from 16 to 12 days). The Project provides the introduction of the preliminary exchange system of information between customs service and the participants of the transportation process and expects granting the complex services of the infrastructure of the logistics. In 2013 the experts of all countries designed the project of the agreement, which is planned to be signed in the nearest future. [Transport corridors, 2015, p. 66-67].

At the moment American initiative of the further development of TRACECA, "New Silk way" is realized, in addition to European initiative of TRACECA, which for the first time was announced in 2011 as a possible way of Afghanistan's greater integration to the region. The project comprises traditional approaches such as recovering the trade ways and relationships, reconstruction of the infrastructure, creation of the new transit and "North - South" trade ways, connecting Central Asian countries, Afghanistan, Pakistan, India and other states. For the realization of the project not only reliable and qualitative roads, bridges and border infrastructure are necessary, but also the harmonization of national customs systems so as the neighbouring states could avoid all legal, formal and informal barriers and co-operate effectively.

Besides, the Chinese project "New Silk way" brought forth in the alternative to TRACECA project, which has found its reflection in "One belt - one way" approach, announced by PRC Leader, Ci Czinipin, in September, 2013 in Kazakhstan; seems to be interesting. The Project belongs to the trade routes, lying on the lands from China through Central Asia, Iran, Iraq and Turkey (through Bosfor) to Northwest Europe. This approach is more ambitious than New Eurasian Continental Bridge [Transport corridors, 2015, p. 27]. NEACB is a project, spreading to regional scales, and "One belt - one way" is a global one.

Thus, in spite of some difficulties, TRACECA is a project with great future, which will create conditions not only for the productive cooperation between the Republic of Azerbaijan and the Republic of Uzbekistan, but also for all the participants of the project, with prospect of the inclusion of the world scale.

References:

1. Gasanov A (2007) Modern international relations and external policy of Azerbaijan. B. "Sharq-Garb"(East – West). 2007. 904 p.
2. Guseynova I (2005) Geydar Aliev - from a political leader to the national leader. B, "Tahsil", 2005, 504 p.
3. (2016) EUROPEAN UNION - TASIS. The Development of the networks: TRACECA. The Technical requirement. Training for workers of the sea transport Azerbaijan, Georgia, Kazakhstan, Turkmenistan, Ukraine.
4. Zaslavskiy I (2005) Deal pipe. The Baku-Tbilisi - Dzheyhan and Kazakhstan choice on the Caspian Sea. M, "Europe", 2005, 36 p.
5. Karimov I (1999) We build our future with our own hands. T, "Uzbekistan", 1999. 382 p.
6. Mirzaev R (2004) Geopolitics of the New Silk Way. M. “Izvestiya” (Notify) 2004. 304 p.
7. (2015) The transport corridors of Eurasia: new ways of cooperation: The materials of the international conference (the April 20 2015, Astana) / E.T. Karin. - A.: Kazakhstan institute of the strategic studies under the President of the Republic of Kazakhstan, 2015. - 112 p.
8. Turaeva MO (2014) Transport infrastructure of Central Asian countries in terms of modern regionalization. Report. - M. Institute of the economy RAS. 2014. 62 p. 15)
9. Fedotova S (2004) TRACECA - a way to integration. // Pravda Vostoka (Truth of East).- 27.07.2004.
10. Zeyno Baran (2005) The Baku-Tbilisi-Dzheyhan Pipeline: Implications for Turkey // the Baku-Tbilisi- Dzheyhan Pipeline: Oil Window to the West - The Central Asia-Caucasus Institute, Silk Road Studies Program, 2005.
11. (2016) Available: http://www.transcaspian.az (Accessed: 10.06.2016).
12. (2016) Available: www.azerbaijan.az (Accessed: 10.06.2016).
13. (2016) Available: http://www.wikipedia.org (Accessed: 10.06.2016).
14. (2016) Available: http://www.uzvt.uz/index (Accessed: 10.06.2016).
15. (2016) Available: http://refd.ru/look/1735317.html (Accessed: 10.06.2016).
16. (2016) Available: http://www.trend.az/business/economv/2475882.html (Accessed: 10.06.2016).

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SECTION 13. Geography. History. Oceanology. Meteorology.

FERGHANA VALLEY, SMALL AND MEDIUM-SIZED CITIES IN DEMOGRAPHIC POTENTIAL

Abstract: *Scientific article about study of the demographic picture Fergana valleys, as follows study small and average city. In article are brought row statistical data that allows objective to reveal the essence of the under study problem.*

Key words: *city, valley, demography, small and average city, population, statistics.*

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Today, half the world's population lives in urban areas. Cities are increasingly expanding the number of its population is constantly increasing. Therefore, a lot of villages changed their place as towns.

These indicators can not be observed during the last two centuries, the increasing number of urban areas in the world. In 1900, 14 per cent of the world's population lived in cities in 1950, 29 percent in 1990 to 43.2 percent in 2006, nearly 50 percent. In 2010, the share of the population of the city according to UN demographic forecast 51.3 percent and 55.9 percent in 2020 to 60.8 percent in 2030 would be equal to [1, p.56].

Data show that in 2030, close to 60% of the earth's population lives in urban areas, most of which Australia and Oceania. However, this urbanization on the continent which is the lowest level in 20 years of the last century [2, p.192].

Uzbekistan gained its independence, the city changed. Them up to the level of development of public policy, urban planning, legal foundations. In this context, on April 4, 2002, the Oliy Majlis of the Republic of Uzbekistan "On the Town Planning Code" as a result of the adoption of the resolution on the approval of regulation of the law on urban planning documentation, according to types of settlements. In particular:

1- group. Population of more than 1 million in the largest cities. This city which is the capital city of Tashkent in Uzbekistan.

2-group. The number of population of 250 thousand to 1 million large cities. In this city of 3, these Andijan, Samarkand and Namangan.

3-group. The number of the population of 100 thousand to 250 thousand in big cities. These towns 9, Nukus, Bukhara, Karshi, Kokand, Jizzakh, Navoiy, development, Almalyk, Angren, Chirchik, Ferghana, Urgench city.

4-group. The number of the population of 50 thousand to 100 thousand medium-sized cities. 17 cities in Uzbekistan, Beruni, Turtkul, sir, Asaka, Shahrixan, Kagan, a safe, Chust town, Zarpafshon, Kattakurgan, the Taylak, Urgut Denov, Gulistan and Bekabad city.

5-group. Population of 50 thousand small towns. In this city of 86 [3, p.30].

It is known that the number of cities during the years of independence, the quality of attention. Therefore, structural changes in the status of the city in the past years, the city differs significantly changed. Only 3 town to town, they Samarkand region, Payarik (1994), in Bukhara region of Shafirkan (1995) and Navoiy province Yangirabot (1998), which resulted in five cities in group three.

Soviet period, a number of historical place names instead of the history of the language and the people in general do not "red" words into the habit of [4, p.95]. As a result, several people have been passed down from generation to generation for centuries of historical names have disappeared. Paved the way for the restoration of the independence of these names. In this regard, the

President of the Republic "to change the names associated with the Communist ideology" has signed a decree of the Uzbek people and its language are not directly related to the elimination of unfair and names more than thirty historical name was restored (table 1).

Table 1

Ferghana Valley and restoration of the historical name of the city.

№	Regions name	The old name of the towns	The new names of towns
1	Andijan	Ilichevsk	Karasuv
2	Ferghana	Kirov	Besharik
3	Ferghana	Kuybishev	Rishtan
4	Andijan	Leninsk	Asaka
5	Andijan	Moskovskiy	Shakhrikhan
6	Andijan	Sovetobod	Honobod
7	Andijan	Sufikishlak	Ahunboboyev
8	Ferghana	Yangi margilan	Ferghana
9	Andijan	Kukan kishlak	Pahtaobod

Independence, President Islam Karimov's initiative and under the guidance of urban and rural reconstruction, improvement. Change according to the country's image in the world attention to issues of the heart. In particular, on August 3, 2009, housing construction in rural areas "model projects" in accordance with the decision of the PF-1167 as a result of the construction of a modern urban-style residential areas, cities, unique look. This decision and the requirements of modern cities and urban settlements in accordance with national traditions, into the development of a comprehensive legal view.

Today, cities, towns, regions and cities subordinated to the republic was divided, the city is now a total of 1,199 contacts, of which 119 are in the city and 1080 in the town. It has 443 settlements in the valley including 28 cities and 415 towns . At the same time, Ferghana region, 23 medium and small size, 5 large cities as well. [4, p.133].

Over the past years, as in the whole of the cities of the valley centuries of creative works. Historical memories associated with a number of complexes have been reconstructed, and new ones created. In particular, set Al-Fargani complex areas of the holy shrines, architectural monuments to its original condition.

Uzbekistan's Ferghana Valley, its socio-economic and cultural, especially with the demographic potential of the region in the center of attention of many scientists. The region occupies only 4.1% of the total area of the republic, 28.2 percent of the country's population live. Residents of a square. km. 438.3 people. The share of the working-age population makes up 61.3 percent of the population of the valley [5, p.33].

Valley region are concentrated most of the country's population, the more the structure of the population of the rural population in the coming years. Since 2009, this trend is, on the contrary, led to the priorities of the rural population declining population of the city. It is related to the granting of the rural population living in the town, the city showed the effects of the status of cities. As well as small and medium-sized cities, the population did not go through the villages.

Small and medium-sized cities, according to 2011 statistics, 12.7% of Andijan, Namangan region, 12.1% and 7.0% in the Ferghana region's population. The difference in the demographic potential of a population in a small town in the region. This figure seems to be one of the regions is considered to be a difference. If the regional level seen Chust in Namangan, Andijan in Shahrikhon, Ferghana region Hamza city, these small towns in regions of high demographic potential. Dustlik the large number of small towns in the entire valley with the leader, Hamza city is leader only in Ferghana region. Because the rest of the population of this town in the province of small towns (of Chartak, Kasansay, Pop, of Turakurgan).

The potential of the population of the valley's small towns can be divided into the following groups:

1. Population's demographic potential is higher areas: (81,7-70,1 thousand people) - Dustlik, Shaxrohon, Asaka city;

2. Population's demographic potential is average areas: (57,6-40,0 thousand) -Chortoq of Turakurgan, Kasansay Pop, Quva, Uchkurgan;

3. Population's demographic potential is low areas: (39,2-25,9) - Kurgan, Rishton, the Akhunbabaev, Poytug' Suu, Khakkulobod, Quvasoy Rishdan Khanabad, Pakhtaobad, Khojaobod, Besharik, Marhamat cities.

The center of economic reforms aimed at the creation of a stable and efficient economy

demographic situation. Because of the high population growth rates. In recent years, the natural population growth rate has dropped slightly, but he still has some of the top countries in extent [6, p.306].

Increasing the capacity of the population plays an important role in its growth rate. Over the past 20 years, the valley's small and medium-sized cities in the face of demographic specific way. According to statistical data, in the valley of small and medium-sized cities, the total population of 557 thousand 900 people in 1991, 945 thousand 200 people by the year 2011 grew by 169.4%. Of course, the population growth rate for the region's small and medium-sized cities were equal. For example, in the Namangan region made up 183.8 percent, the Ferghana region, 181.2 percent, 165.7 percent in the region [7, p.32].

It seems that the population of the cities in the region over the last years 557.9 945.2%. Population growth in the number of the leading cities of Ferghana region, and in this regard the leader Hamza. Further in the region of small cities (the Akhunbabaev). Namangan (Pop) region, which cities are the cities of Andijan region, is quite different from the rest of the city only Hamza cities.

The region's small and medium-sized cities in the 2011 demographic potential of the region (393,8), hereinafter referred to Namangan (367,1) and Ferghana (217,8) regions in the sequence. Andijan high demographic potential of the region is higher than that of the rest of the cities of the two regions in the country.[8, p.157]

As a result, the Ferghana Valley, the small and medium-sized cities in the last twenty years can be divided into 4 groups according to the level of population growth.

- The first group is lower population growth rate (the middle one-year increase 0,70-1,35%) .They are: Khanabad, Pakhtaobad, Quvasoy [9, p.94];

- The second group is average population growth rate (an average annual increase 2,0-2,60%) .They are: Asaka, Shahrixan, Kara-Suu, Poytug, Dustlik, Chartak, Kasansay, Uchkurgan, Khakkulobod, Kuva, Rishton, Besharik;

-The third group is higher population growth rate (an average annual increase of 3,05-4,15%). They are: Kurgantepa, Marhamat, Xodjaabad, Yaypan;

-The fourth group is the highest growth rate (an average annual increase of 5,50-7,75%) cities. They are: Akhunbabaev, Pop, Turakurgan Hamza.[10, p.172]

References:

1. Ahmedov E (1991) In Independence. – Tashkent: “Cities of Abu Ali Ibn Sina Medical Publishing House”, 1991.
2. Abdurakhmanov K (2011) Trends in the development of the process of aging in the population of the Republic of Uzbekistan // Demographic development of the Republic of Uzbekistan in independence.(Material of republic scientific-practical conference for20th anniversary of independence) ownership. – Tashkent, 2011.
3. Kayumov A (2010) Interrelationship between the processes of urbanization and demographic // Geographical Society axboroti. – Tashkent, 2010.
4. Xadjamurotova MX (2011) Fargana Valley demographic history (1991-2006). Candidate of historical subjects. diss. – Tashkent, 2011.
5. Ata-Mirzaev O, Gentshke V, Murtazaeva R (2011) Uzbekistan multinational: historian-demographic aspekt.-Tashkent, 2011.
6. (1998) The City Cube under Ahmade Al-Ferganiy. -Tashkent: Fan, 1998.
7. Otamirzaev O (1970) Katanov.And. The City Fergan’s valley. -Tashkent, 1970.
8. Bobozhonova D (1999) Public-economic relations in Uzbekistan (on example 70-80) -Tashkent: Shark, 1999.
9. Bobozhonova D (1995) Demographic processes in Uzbekistan and their osobennosti.-Tashkent: Science, 1995.
10. Burieva MR (1997) The Demography to families in Uzbekistan. -Tashkent: University, 1997.

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SECTION 13. Geography. History. Oceanology. Meteorology.

SOVIET POLICY IN THE FIELD OF CULTURES IN TURKESTAN

Abstract*: The scientific article about cultural reform soviet authorities on territory of Turkestan. On example of the realization politicians to liquidations to illiteracy author have revealed row problem. As follows in not grasp of the personnel(frames), absence resource, not understanding the question and others.*

Key words*: cultural reform, absence resource, Turkestan, nation, nationality, to liquidations to illiteracy.*

Language*: English*

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The Constructive transformation of the economy independent Uzbekistan dialectical intertwines with improvement of the spiritual life society. What the President of the Republic Uzbekistan I.A.Karimov "Soviet social policy emphasized, was simply obtruded our folk. She did not correspond to his(its) scolded moral, moral, spiritual value. Exactly so it was formed such big breakup meantime that was declaimed in system this government, and that that was indeed. The Persons, its material, spiritual need occupied in this system of one of the last places. Such state had not future".[1, 23]

In context of the planting to soviet ideology big importance was spared change the spiritual world of the broad public masses, "re-education" people. Did not escape that fact that in cultural and politician to work "must be called old politicians to communist party". Such approach has brought about that that from the very beginning "cultural construction" has taken nature. It aimed at statement in ambience of the broad masses unattractive devil totalistic to personalities, to poor suit public literature, loss ancient tradition and custom.

Not less it is important also to take into account that soviet managament instead of objective necessary process of the consequent integration original east and the best sample of the west culture, artificially opposed to them to each other. The Presentations in its main mass European part populations, bolsheviks with contempt pertained to spiritual conquests folk Orient. The Dominant criterion of the cultural progress emerged the degree of the mastering "European culture" in russian variant of her(its) expression. Moreover the last, turned out to be at most politicized and farfetched "proletarizm".

The Bolsheviks resolutely cut off not only the most rich layers "prerevolutionary" spiritual heritage folk national fringes, but also most russian folk, having left only that part, which could serve the purpose of the building to communist empire. The Cultural policy new authorities, aside from totalitarian ideological of the sterilisations of the broad public masses, executed the function to consequent rusification, called to clamp the spiritual unity all folk unitary soviet state. [2,149-150]

March 5 1918 were created Public Komissariat Enlightenments TASSR (Narkompros). The April 30 1918 were organized marginal, regional and town, district and advices public education [3,13]. On the first time marginal advice activity of the public education and its Executive Committees were not connected with local councils of the enlightenment. They concerned with the questions, concerning stating the school deal in Tashkent mainly, increased the contradictions between Executive Committee and Narkomprosom. As a result, 21 May 1918 TASSR stand; bear resolution about dismissal of the Marginal Advice of the public education. [4,62]

Cultural work closely touched with activity Public commissariat enlightenments. On the grounds of "Positions about organizations of the deal of the public education in Turkestan edge" (the August 17 1918), the general managament deal enlightenments was sent Narkomprosu TASSR. [5,124] First steps

cultural construction in Turk republic passed in very heavy condition. The Republic was girded burning ring of the civil war, public facilities of the edge was destroyed, nearly completely were absent the local personnel, textbooks and scholastic allowances on родном language. About established position M.V.Frunze noted that "groups of ten of a thousands muscleman -poor person - a mass darkenning, illiterate, residing under influence баев and mullahs so problem to paramount importance is behooving production political of the work amongst scolded populations" [6,31].

Coming from soviet period of the beliefs about cultural development of the population Turkestan, bolshevik managament has brought forth in number priority problem "exterpations of the darkness and ignorance of the labor moslem folk". She introduced in the manner of heavy heritage of the tsarism and its colonial politicians. The Component part of this problem was declared fight for liquidation "illiteracy".

Certainly, in ideological plan problem increasing level to literacy was in considered years it is enough actual. After all even with provision for numbers "labor bottom of" local population, got primary formation in medrese and maktab, the general factor to alphabetical illiteracy, particularly not settle, was not allow. So national intellectuals not only greeted this action, but also undertook the participation in organizations of the schools and course likbez (liquidation to illiteracy). Together with that soviet liquidation to illiteracy in principle carried unambiguous ideological directivity. Political managament of the country, undertaking course on liquidation of illiteracy, came from that that ungrammatical, subject to "prejudice past" people, can't consciously participate the socialism" in "making. [7,151]

Parallel with adjustment of the soviet system of the school formation intensive work was conducted on liquidations not soviet types of the schools. In provision this important for bolshevik managament of the problem in 1917-1918 gg. SNK RSFSR has taken the row a decree-law targeted on removal "interference" Church in deal of the school. In particular, January 23 1918 were accepted decree-law "About branch church from state and schools from church ". In all state, public and quotient institutions was forbidden teaching religious religion.

Was it herewith forgotten that in edge earlier acted the representative network national-religious educational institutions, in which young generations population of Turkestan, alongside with study moslem teaching, have possessed the arabic system of writing, got acquainted with spiritual achievements of its folk. However in Turkestan scolded population watchful pertained to soviet school.

His(its) likings more spread on traditional maktab (schools). So in reality sharp political fight, when main regions of the edge were engulfed by rebel motion, local government did not dare in destroy the confessions of the educational institutions. Medrese and maktab (schools) formally had a right on existence. Together with that party and soviet organs did all the best to economic problems them. The Successful decision of this problem promoted the nationalizing an vakuf property, the lands of the religious institutions, with incom which were kept religious cultural to organizations and confessions of the school.

Subsequent to the Centre of the arduous efforts on building of the school have unfolded in edge Public commissariat TASSR and his(its) divisions at local councils. The new system of the public enlightenment united labor soviet school was recognized instead of maktab (schools). She divided on two steps: the first, for children from 8 before 13 years (the five-year course), and the second - from 13 before 17 years (the four-year course).

Priority attention to soviet school has defined the rash expansion to its network. The First schools for children of the local nationalities were open in g. Skobelev (town is Fergana) under the direction of T.N.Kary-Niyazova (1917), in That-Tyube (near Tashkent) under the direction of Akilhana Sharafutdinova (1917.). [8,67]

In republic since May 1918 on September 1919 were openly 905 new grade schools. Such are a national schools in 1918 in Kokand was openly 17 schools, in Skobelev district - 6, in Tashkent-5. From functioned in Turkestan's republic 121 schools 57 were national. In 1918-1919 gg. in Samarkand area was openly more than 100 schools[9,224].

On territory Perovsk district worked 58 schools, in which were trained 4660 children, including 1768 kazakhs. In Aulie-Ata district was 100 schools, from which 25 schools were open for the first time, in they worked 130 teachers, open were 73 evening groups. In 1919 in Semirechie and Syrdariya area was openly 27 uzbek, 6 dungan, 4 uigur schools. [10,14-15] Formation and development of the soviet school in data area had their own specific particularities. In connection with nomadic and semi-nomadic lifestyle for kazakhs were created nomadic schools[11,56].

In 1919 in Turkestan's republic numbered more than 100 russian-kirghiz schools moreover of them national - 10 schools II step. In each school was trained from 20 before 150 children [12,25]. The Russian teacher happened to to work at translator, don't know russian language, however, these courses have played the certain role in preparing the local personnel. In consequence were an open courses of the obligatory education soviet workman local language majority populations[13,126].

The main problem was seen in that to transform the schools from instrument "mastery to bourgeoisies

and squire in instrument mastery worker of the class", from facility "spiritual enslavement of the masses in facility of their liberation" from "reactionary ideology", do the school "authentic centre of the enlightenment of folk".

Indeed school formation in many has caused the opposite results. Before her was put (deliver)ed in base its immoral purpose: shaping answerring request of the communist mode averaged to personalities, orientating to system of class valuables.

References:

1. Karimov IA (1995) The Cardinal principles public-political and economic development Uzbekistan. - Tashkent: Uzbekistan, 1995. - pp.23.
2. Tilekulov S, Golovanov A, Orazymbetov SH, Kosanbaev S (2002) Turkestan on history tumbling: 1917-1920 yy. - Tashkent: Izd.imeni A.Kadyri, 2002. - pp.149-150.
3. (2016) CGA RUZ., F.R.34, op.1, d.25, l.13.
4. (2016) CGA RUZ., F.R.34, op.1, d.33, l.62.
5. Izmaylov AE (1973) The Enlightenment in republic of Soviet Turkestan. - Moscow: Pedagogika, 1973. -pp.124.
6. Nazarov MH (1991) The Commander Turkfront. - Tashkent: Uzbekistan, 1991. - pp.31.
7. Tilekulov S, Golovanov A, Orazymbetov SH, Kosanbaev S (2002) Turkestan on history tumbling: 1917-1920 yy. – Tashkent, 2002. - pp.151.
8. Abdullaev SS (1960) From history of the development of the culture folk Uzbekistan. - Tashkent, 1960. - pp.67.
9. (2016) CGA RUZ., F.R.17, op.1, d.114, l.224.
10. Sagintaev IS (1978) The History of the development of the school and public education in the south and юговостоке Kazakhstan (1860-1930 gg.).: Avtoref. dis.... kand. ped. Science. - Tashkent, 1978. - pp.14-15.
11. (1919) The Public education of kirghiz folk // Life nationals. - Moscow, 1919. - 16. - pp.56.
12. (1919) The Enlightenment national minority // Public formation. - Tashkent, 1919. - 34. - pp.25.
13. (2016) CGA RUZ., F.R.36, op.1, d.148, l.5; d.42, l.126.

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SECTION 7. Mechanics and machine construction.

THE SIMULATION OF CUTTING PROCESS OF THE CYLINDRICAL MILLING CUTTER

Abstract: *The article is presented the structure cards of the conditions of processing of flat surface of the milling in the software package LS-DYNA. The analysis of cutting process of the cylindrical milling cutter with helical cutting teeth was made.*

Key words: *a milling, a milling cutter, a billet, a card, a variable, a key word.*

Language: *English*

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Introduction

Cylindrical milling is used in cases when it is necessary to mechanically process flat surface of a billet of substantial width of the cutting tool. The cylindrical milling cutter is a multiblade cutting tool, the perceiver variable load during the work. Improve the process of milling flat surfaces on the production is achieved by using a cylindrical milling cutters with the helical cutting teeth. Cylindrical milling cutters with the straight cutting teeth are used less, mainly for the milling of narrow surfaces [1, 2].

During the cylindrical milling (in this work it is considered conventional milling) in the cutting zone acts tangential and radial forces, the force of friction, leading to wear and the thermal deformations of the cutting edges of the tool. All of these factors can lead to processing errors (deviation from specified dimensions, geometric shapes or the correct positioning of the surfaces).

This problem has been considered in the various scientific research works. In the work [3] the results by the computer simulation of milling process the ledge of the end milling cutter are presented. It was made the optimization of cutting feed of the cutting tool on the basis of the contours of distribution of the plastic deformations, stresses and shear strains of the material in the cutting zone. The article [4] is described the mechanism of formation the systematic errors of forming when the processing the outer cylindrical surfaces of cylindrical milling cutters with axial and radial feeds, and the analytical dependence is derived for definition of errors that allowing you to control of the process parameters. The comparison of the geometric roughness of the processed flat and contoured surfaces during climb milling and conventional milling is presented in work [5]. It was determined that the trajectory of the cutting tooth during the conventional milling is an inverted trajectory of climb milling. The milling of convex geometric profile provides a lower surface roughness by the compare of the milling concave surfaces. The influence of the rounding radius of the cutting edge on the stress-strain state of the zone of the chip formation and on the surface quality when milling was investigated in the research work [6]. During the roughing it is recommended to use a cutting tool with a rounding radius in the range of 0.01 – 0.03 mm, and when finishing with optimum rounding radius 0.03 – 0.04 mm provides the smallest cumulative deformation and roughness of the processed surface.

The research of the process of milling of the cylindrical milling cutter with the helical cutting teeth by the approach of computer modeling will allow to receive the authentic results of the stress-strain state of the material of the billet. The changing of cutting modes during the simulation enables for the engineer to correct of the technological process of milling on the machines with the numerical control (CNC), which it is an actual task for automated machinery production.

Materials and methods

The research of subject was the contact interaction of cutting edges of the milling cutter with the processed surface of the billet in conditions of conventional milling.

The creation and subsequent orientation in the global coordinate system solid of models of the billet and the cylindrical milling cutter with helical cutting teeth can be performed in any CAD system.

The parameters of the models of billet and cylindrical milling cutter are presented in table 1.

Table 1

The parameters of the billet and the cylindrical milling cutter.

Name of the parameter	Reference designation	Unit of the measurement	Magnitude
A billet			
Length	L_b	mm	50
Width	B	mm	50
Height	H	mm	20
The cylindrical milling cutter			
The outside diameter of the milling cutter	d_m	mm	70
The length of the cutting part of the milling cutter	l_m	mm	52
The total length of the milling cutter	L_m	mm	60
Rake angle	γ	deg.	10
Clearance angle	α	deg.	10
Helix angle	ω	deg.	36
Width of cylindrical facet	f	mm	1
The outside diameter of the flanges of the milling cutter	d_f	mm	54
Hole diameter	D	mm	28
Keyway width	b_k	mm	7
Keyway depth	t_k	mm	3

The magnitude γ of the cylindrical milling cutter is selected in depending on processed material and the character of processing. For this type of milling with constant cutting depth γ is performed positive. In order to increase resistance of cutting tools α was taken to be the magnitude of not more than 10 degrees.

The helix angle of the cutting blade is used to increase the smoothness of work of the cylindrical milling cutter and for creating the direction of the descending chip on the tooth face [7].

The orientation of solid models of the billet and the cylindrical milling cutter with helical cutting teeth in three-dimensional formulation is presented in Fig. 1.

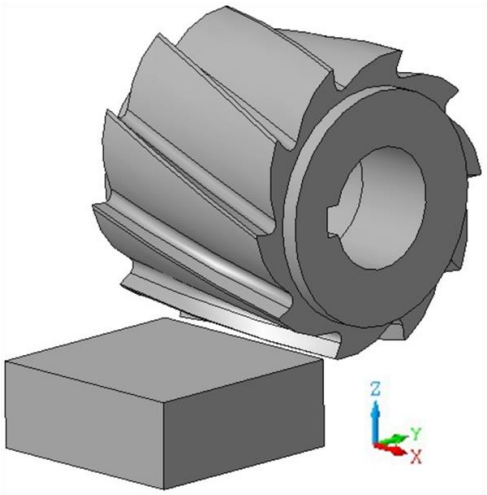
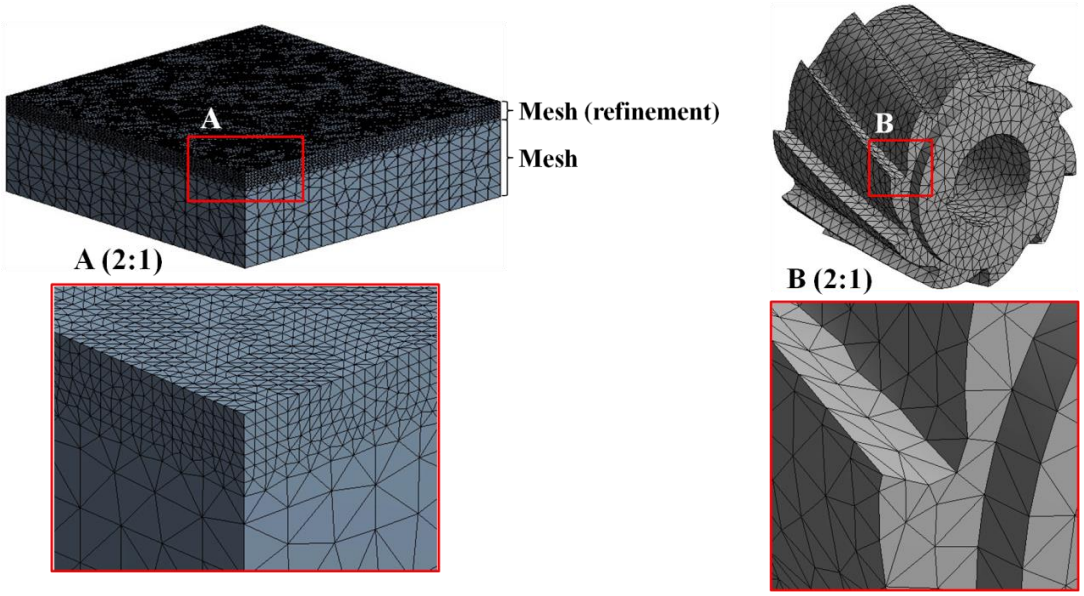


Figure 1 – The orientation of the models of billet and cylindrical milling cutter.

To reduce the size of the file the model of the fixture for clamping of billet (vice) was not created. The billet was fixed for the bearing flat surface and didn't move around the coordinate axes. The milling process was carried out at the combination of two motions: a rectilinear translational motion of s with

velocity of 1000 mm/s and the rotational motion *n* around its axis with a frequency 2865 min^{-1} of the cylindrical milling cutter. The translational motion of the cutting tool directed toward to the billet. The cutting depth *t* was accepted magnitude of 2 mm. The cylindrical milling cutter has 10 cutting teeth.

The models of the billet and the milling cutter are split into finite elements in Explicit Dynamics module of Ansys program (Fig. 2).



a) b)

Figure 2 – Split solid models into finite elements: a – billet, b – cylindrical milling cutter.

The model of the billet was split into 70286 elements (16873 nodes), the model of the cylindrical milling cutter was split into 27660 elements (6066 nodes).

The removable layer of material (allowance) from the model of billet had the smaller size of the finite elements (refinement) than the other layers. It should be noted that the reducing of the size the finite element allows to obtain the more accurate results of the research. However, it leads to an increase the amount of data and, consequently, for to implement the calculation will require the significant computing resources.

The setting of processing conditions and simulation of milling process was implemented in the program LS-DYNA [8]. The choice of the type of finite element, material properties, type of contact, the character of the motion models of the billet and the cylindrical milling cutter were performed by the special cards [9].

The identification of the models of the billet (2) and the cutting tool (1) are executed with the help of the card of the key word *PART (table 2).

Table 2

The cards of the setting of the parameters of the structural unit of the models.

*PART							
pid	secid	mid	eosid	hgid	grav	adpopt	tmid
1	1	1					
*PART							
pid	secid	mid	eosid	hgid	grav	adpopt	tmid
2	2	2					

The assignment of material parameters and the types of elements was performed by three variables: *pid* (model number), *secid* (section identification defined in the *SECTION section), and *mid* (material identification defined in the *MAT section).

The solid elements are set for models. The completed card is presented in table 3.

Table 3

The cards of the setting of the properties of the elements of the solid type.

*SECTION_SOLID		
secid	elform	aet
1	1	
*SECTION_SOLID		
secid	elform	aet
2	1	

Section ID (*secid*) and element formulation options (*elform*) are selected in the card. The constant stress solid element (defaults) is used in accordance with equation 1.

As a processed material it was selected by the structural steel. The milling cutter made of the tool steel. The milling cutter is adopted of perfectly rigid body (card of the key word *MAT_RIGID), don't subject to deformations, billet – plastic material (card of the key word *MAT_PLASTIC_KINEMATIC) with the properties of isotropic and kinematic hardening. The material models for the billet and the cylindrical milling cutter are recorded in table 4.

Table 4

The cards are given models of material and their characteristics.

*MAT_RIGID							
mid	ro	e	pr	n	couple	m	alias
1	7.85e-9	2e+5	0.3	0	0	0	
cmo	con1	con2					
1	6	5					
lco or a1	a2	a3	v1	v2	v3		
0	0	0	0	0			
*MAT_PLASTIC_KINEMATIC							
mid	ro	e	pr	sigy	etan	beta	
2	7.85e-9	2e+5	0.3	250	960		
src	srp	fs	vp				
0	0	0.78	0				

The identification of the materials of models is implemented by the variable *mid* 1 or 2 (see cards of the key words *PART).

For the material of the cylindrical milling cutter it was taken by following physico-mechanical properties: mass density (*ro*), Young's modulus (*e*), Poisson's ratio (*pr*). The variables *sigy* (yield strength) and *etan* (tangent modulus) are added for the material of the billet. The variables *n*, *couple* and *m* are defined the relationship of the options with module MADYMO3D/CAL3D (rigid body in the local coordinate system).

For the model milling cutter the center of mass constraint (in global directions) sets of the variable *cmo* (EQ.1). The constraints of the displacement of the milling cutter along the coordinate axes X and Z are recorded in *con1* (EQ.6). The choice of rotation milling cutter (around the coordinate axis X) runs variable *con2* (EQ.5). The number of local coordinate system (*lco or a1*) and the parameters of the vectors (*a1 – v3*) were not taken for the calculation.

The ratio of failure strain for eroding elements for steel (variable *fs*) is 0.78.

The contact between the billet and the cylindrical milling cutter was asked by the key word *CONTACT_ERODING_NODES_TO_SURFACE_THERMAL_ID. This key word takes into account elastic-plastic properties of the contacting materials, and when overcoming the resistance of the material of cutting occurs the removal of elements from the surface of the model. Also it provides for the assignment of thermal parameters of the material during processing. The structure of this card of the key word is presented in table 5.

The contact interface ID is defined of the variable *cid*. The cutting teeth of the model cylindrical milling cutter and free from the fixing flat surface of model of the billet (variables *ssid*, *msid*, *sstyp* and *mstyp*) contact.

The magnitudes of static coefficient of friction and viscous damping coefficient in percentage are set, respectively, the variables *fs* and *vdc*. The birth time and the death time of the contact surface are setting of the variables *bt* and *dt*.

Table 5

The card of the setting of the parameters solid contact models with the failure of material.

*CONTACT_ERODING_NODES_TO_SURFACE_THERMAL_ID							
cid							
1							
ssid	msid	sstyp	mstyp	sboxid	mboxid	spr	mpr
1	2	3	3				
fs	fd	dc	vc	vdc	penchk	bt	dt
0.2	0	0	0	20	0	0	1e+20
sfs	sfm	sst	mst	sfst	sfmt	fsf	vsf
1	1	0	0	1	1	1	1
isym	erosop	iadj					
1	1	1					
cf	frad	htc	gcrit	gmax	cd_fact	bc_flg	algo
0	0	4.7e-5	2	10000	1		

In the fourth line of the card there are recorded parameters of scale factors for the two models.

The parameters of the direct contact of the models are given in the fifth line of the card:

isym – symmetry plane option (EQ.1 – do not include faces with normal boundary constraints);

erosop – erosion/interior node option (EQ.1 – storage is allocated so that eroding contact can occur);

iadj – adjacent material treatment for solid elements (EQ.1 – solid element faces are included if they are on the boundary of the material subset).

The magnitudes of thermal conductance for the closed gaps, the critical gap, the gap, in which there is no thermal contact, and the multiplier which is used on the element characteristic distance for the search routine are selected by using variables *htc*, *gcrit*, *gmax* and *cd_fact*, recorded in the sixth line of the card.

The motion of the models is carried out by the five cards. The key words *BOUNDARY_PRESCRIBED_MOTION_SET_ID, for cylindrical milling cutter – *BOUNDARY_PRESCRIBED_MOTION_RIGID are used for the billet (table 6).

Table 6

The cards define the desired law of motion of the models.

*BOUNDARY_PRESCRIBED_MOTION_SET_ID							
$ 1Displacement							
$ Billet							
id	dof	vad	lcid	sf	vid	death	birth
2	1	2	3	1	0	0	0
*BOUNDARY_PRESCRIBED_MOTION_SET_ID							
$ 2Displacement							
$ Billet							
id	dof	vad	lcid	sf	vid	death	birth
2	2	2	4	1	0	0	0
*BOUNDARY_PRESCRIBED_MOTION_SET_ID							
$ 3Displacement							
$ Billet							
id	dof	vad	lcid	sf	vid	death	birth
2	3	2	5	1	0	0	0
*BOUNDARY_PRESCRIBED_MOTION_RIGID							
$ Displacement							
$ Cylindrical milling cutter							
pid	dof	vad	lcid	sf	vid	death	birth
1	2	0	6	1	0	1e+28	
*BOUNDARY_PRESCRIBED_MOTION_RIGID							
$ Rotation							
$ Cylindrical milling cutter							
pid	dof	vad	lcid	sf	vid	death	birth
1	5	0	7	1	0	1e+28	

The variables *id* and *pid* is the identification of the models. For billet the constraint of motion along the coordinate axes is defined of the variable *dof* (EQ. 1, 2, 3). The cylindrical milling cutter is moved along the Y-axis (*dof* 2) and has a degree of freedom of the rotational motion around the X-axis (*dof* 5).

The flags-signs of *vad* set the parameters of the motion of the model: 2 – displacement and 0 – velocity. By each movement there is assigned an ID for the description of the dependence of the velocity models from time (*lcid* 3 – 7). The load curve scale factor *sf* defaults equal 1. The time imposed motion/constraint (activated *death*) was taken by default.

The choice of the velocity motion at time intervals of simulation of the milling process (0 – 0.005 s, 0.005 – 0.02 s, 0.02 – 0.06 s) is presented in cards of the key word *DEFINE_CURVE (table 7).

Table 7

The cards of the setting of the table relationship between two variables.

		*DEFINE_CURVE				
lcid	sidr	sfa	sfo	offa	offo	dattyp
3						
	a1		o1			
	0		0			
	0.005		0			
	0.02		0			
	0.06		0			
		*DEFINE_CURVE				
lcid	sidr	sfa	sfo	offa	offo	dattyp
4						
	a1		o1			
	0		0			
	0.005		0			
	0.02		0			
	0.06		0			
		*DEFINE_CURVE				
lcid	sidr	sfa	sfo	offa	offo	dattyp
5						
	a1		o1			
	0		0			
	0.005		0			
	0.02		0			
	0.06		0			
		*DEFINE_CURVE				
lcid	sidr	sfa	sfo	offa	offo	dattyp
6		1	1			
	a1		o1			
	0		0			
	0.005		-1000			
	0.02		-1000			
	0.06		-1000			
		*DEFINE_CURVE				
lcid	sidr	sfa	sfo	offa	offo	dattyp
7		1	1			
	a1		o1			
	0		0			
	0.005		-300			
	0.02		-300			
	0.06		-300			

The key word *DEFINE provides a way of defining boxes, the coordinate systems, the load curves, the tables, and the orientation vectors for various uses.

Recorded in the card of the key word *BOUNDARY_PRESCRIBED_MOTION variable *lcid* is specified and in the card of the key word

*DEFINE_CURVE. The scale factors for abscissas and ordinates (*sfa* and *sfo*) were taken by default 1.

The variables *a1* and *o1* set magnitudes of the abscissas and ordinates. The magnitudes of the abscissa – time for milling, the magnitudes of the ordinates – velocities motion of models. Zero in the ordinate corresponds that the model of the billet does not move. The minus sign on the ordinate characterizes the displacement of the cylindrical milling cutter to the billet at a velocity of 1000 mm/s and rotation of the cylindrical milling cutter clockwise with a velocity of 300 rad/s. The displacement velocities of cylindrical milling cutter are not change on throughout the time range of the milling process.

The termination time of simulation of the milling process is recorded by the card, presented in the table 8.

Table 8

The card of the assignment the condition of termination time of the calculation.

*CONTROL_TERMINATION				
endtim	endcyc	dtmin	endeng	endmas
0.06				

The key word control cards are optional and can be used to change defaults to activate such solution of options as a mass scaling, the adaptive remeshing, and an implicit solution.

The saving of the results was carried out every 0.001 s solutions. Reducing the time step of the calculation allows to get on output more detailed view of the cutting process of the material of the cylindrical milling cutter. The card is presented in table 9.

Table 9

The card of the assignment of time interval between outputs.

*DATABASE_BINARY_D3PLOT			
dt	lcdt	beam	npltc
0.001			

In the card it was recorded one variable *dt*, defining the time interval between outputs.

Output format for D3PLOT file recorded by the card of the key word *DATABASE_FORMAT (table 10). In the card *iform* (EQ.0) – LS-DYNA database format, *ibinary* (EQ.0) – word size of the binary output files (64 bit).

Table 10

The card of the assignment of the format writable databases.

*DATABASE_FORMAT	
iform	ibinary
0	0

By using this option one can reduce the size of the binary output files which are created by 64 bits computer such as CRAY and NEC [10].

The size of the created keyword file was 9 MB.

Results and discussion

The cutting of the material of the cylindrical milling cutter on the 0.006, 0.02, 0.04 and 0.06 seconds of the process are presented in Fig. 3 – 6. Coloured contours on the model of the billet show a degree of maximum shear stress of the material.

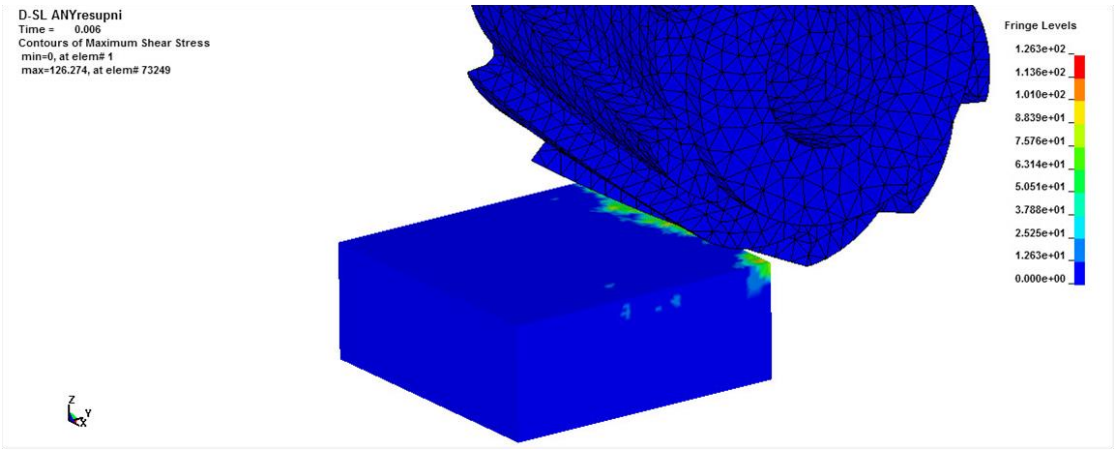


Figure 3 – The maximum shear stress of the billet material during milling cylindrical milling cutter to 0.006 s of the calculation process. The unit of stress is N/mm^2.

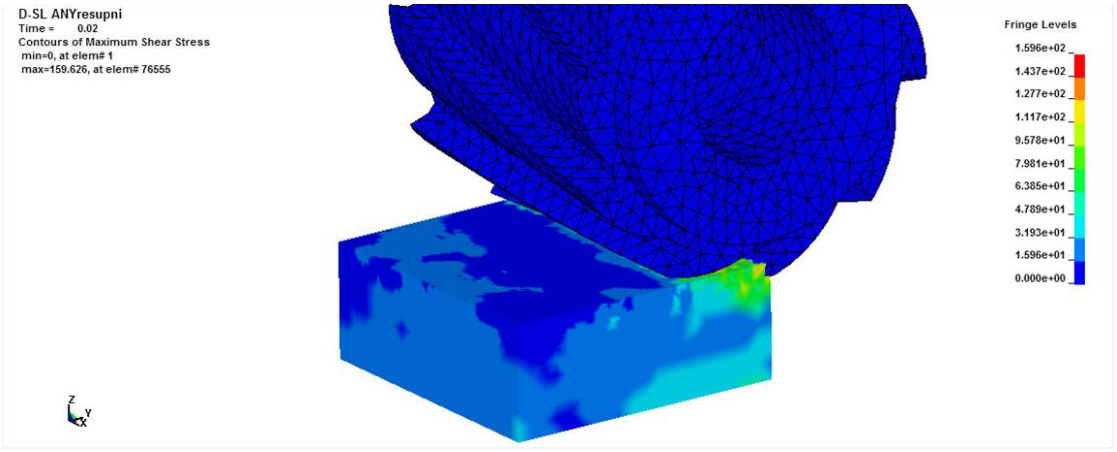


Figure 4 – The maximum shear stress of the billet material during milling cylindrical milling cutter to 0.02 s of the calculation process. The unit of stress is N/mm^2.

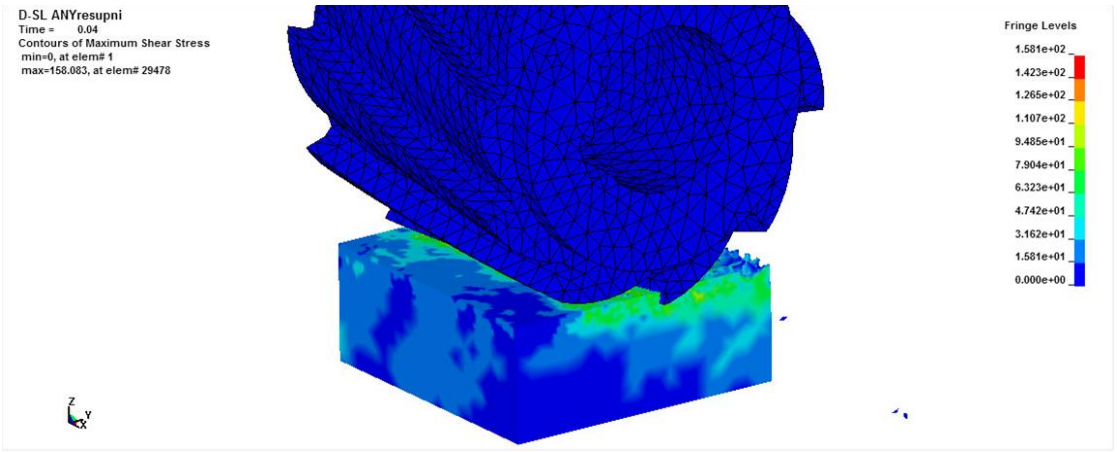


Figure 5 – The maximum shear stress of the billet material during milling cylindrical milling cutter to 0.04 s of the calculation process. The unit of stress is N/mm^2.

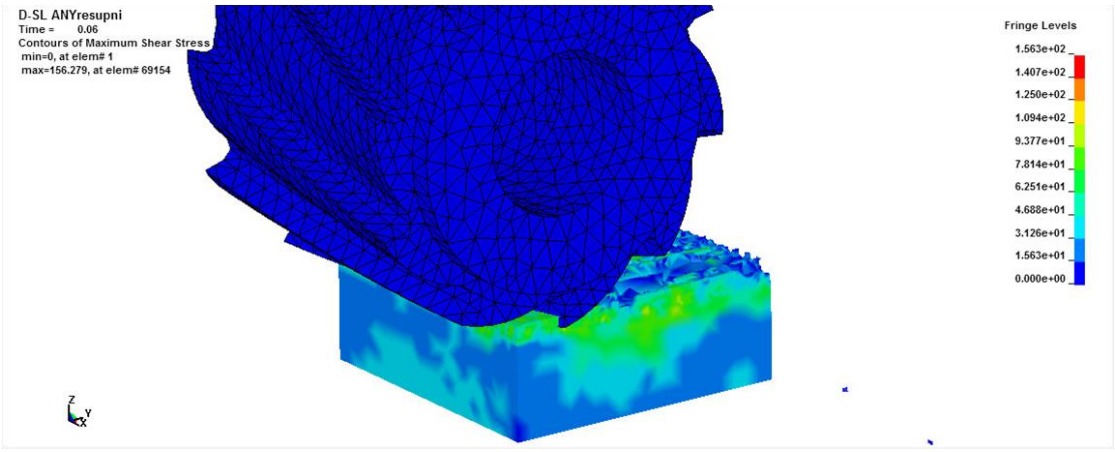


Figure 6 – The maximum shear stress of the billet material during milling cylindrical milling cutter to 0.06 s of the calculation process. The unit of stress is N/mm^2.

Shear stress in the cutting zone reaches of magnitude 125 – 160 N/mm^2. Finite elements of the model of the billet, on which the cutting edges of cylindrical milling cutter are act, is deformed (to damage), and is separated with the processed surface (formation of chips). At full cutting depth of milling and in the different positions of the teeth of the milling cutter, the cutting process is carried out by one or simultaneously (partially) three of cutting edges. There is observed don't uniform the cutting of the layer of material of the billet of the cutting edge of the cylindrical milling cutter. In the central part of the billet, the thickness of a removed layer of the material is reduced. This is due to the withdrawal of the cutting tool from the processed surface of the billet, as a result of the action is of the radial component of the cutting force. The intensity of maximum shear stress of the material of billet constantly is increasing as is passing of the cutting tool to a predetermined length of milling. A complete picture of the stress-strain state of the billet can be obtained by choosing the operations displaying of the fields of strains and stresses on the toolbar of the program LS-DYNA.

Table 11

The control of the parameters of the milling process on one of the cycles of the calculation.

dt of cycle 5821500 is controlled by solid Parameter	Element 36768 Magnitude
Time	5.98888e-2
Time step	1.00258e-8
Kinetic energy	3.22453e6
Internal energy	1.93678e5
Spring and damper energy	1e-20
System damping energy	0
Sliding interface energy	5.47795e4
External work	3.45732e6
Eroded kinetic energy	2.51909e4
Eroded internal energy	1.08185e5
Eroded hourglass energy	-8.11405e4
Total energy	3.39185e6
Total energy/Initial energy	9.81064e-1
Energy ratio w/o eroded energy	9.65955e-1
Global x velocity	-1.79275e1
Global y velocity	-7.18865e2
Global z velocity	-6.15721e-1
CPU time per zone cycle	0 nanoseconds
Average CPU time per zone cycle	107 nanoseconds
Average clock time per zone cycle	109 nanoseconds
Node number 10718 deleted at time 5.98888e-2 Solid element 42462 failed at time 5.98888e-2	

The termination of the calculation occurred on 5832316 cycle. The report on the implementation of the solution is created in a text files "messag", "d3dump" and "d3hsp".

The control of energy and other process parameters of cylindrical milling at 5821500 cycle, the calculation are presented in table 11.

Perform a comparison of parameters of the milling process at the beginning and at the end of the processing. At the end of the milling process are increased to 10^4 times values of the kinetic energy, internal energy, sliding interface energy, external work, eroded kinetic energy and eroded internal energy, total energy. Does not change the value of spring and damper energy, the ratio of total/initial energies and energy ratio w/o eroded energy. The control of the contact is carried out by the quantity and serial numbers of the deformed or deleted elements from the processed surface of the billet.

The information about calculation time (in seconds and in percentage) is presented in table 12.

Table 12

The information about the calculation of time of milling process.

Parameter	CPU (seconds) Magnitude	CPU (%)
Initialization	0	0
Element processing	4.0123e4	65.33
Binary databases	4	0.01
ASCII database	2	0
Contact algorithm	2.1154e4	34.44
Contact entities	0	0
Rigid bodies	1.37e2	0.22
Implicit nonlinear	0	0
Implicit lin. alg.	0	0
Totals	6.1420e4	100

The time of total calculation of the milling process is spent on the control work of the element processing and the contact algorithm.

Conclusion

The quality of the finished product will depend on rationally selected the cutting tool geometry and defined the cutting conditions. The control of the mechanical processing of the billet, on the design stage of the technological process, it is necessary to implement virtually by the programs for the calculating of the nonlinear dynamics. Given a sequence of the computer simulation of milling process with some modifications can be used for the continuous processing of billet with a large number of passages of the cutting tool.

References:

1. (2016) Klassifikatsiya frez. Available: http://machinetools.aggress.ru/index.php/frezernyj-stanok/osnovy-rezanija-metallov/268-klassifikatsija-frez (Accessed: 16.06.2016).
2. (2016) Naznachenie i tipy frez. Available: http://www.info.instrumentmr.ru/freza.shtml (Accessed: 16.06.2016).
3. Medvedev FV, Ponomarev BB, Cheremnyh EA (2009) Modeling of the dynamics of end milling. International Collection of Scientific Papers «Progressive technologies and systems of mechanical engineering», №2 (38), 2009. Pp. 139 – 142.
4. Gryazev MV, Stepanenko AV (2010) Milling the outer cylindrical surface of the cylindrical cutter. "Izvestija Tulskogo gosudarstvennogo universiteta", № 2-1 / 2010. Pp. 137 -140.
5. Tihonova AA, Vinogradov DV (2011) Geometrical surface roughness in cylindrical conventional milling and climb milling. Proceedings of Higher Educational Institutions. Machine Building. № 11 / 2011. Pp. 68 – 71.

6. Breev SV (2011) Improving the quality of surface finish in cylindrical milling on the basis of studies of the stress-strain state of the chip formation zone. The dissertation on competition of a scientific degree of candidate of technical sciences, Komsomolsk-on-Amur, 2011. P. 151.
7. (2016) Geometriya tortsovoy i tsilindricheskoy frezy. Available: http://dlja-mashinostroitelja.info/2010/05/geometriya_frezy/ (Accessed: 16.06.2016).
8. Rapovets VV, Grishkevich AA, Medvedev SV, Ivanets GG (2015) The methodology of modeling during machining of wood materials by milling in the soft LS-DYNA. XI International Eurasian Symposium "Woodworking: technologies, equipment, management of the XXI century". Pp. 1 – 6.
9. LS-DYNA. KEYWORD USER`S MANUAL (VOLUME I, II). – Livermore Software Technology Corporation, 2001.
10. (2016) Cray-1. Available: https://en.wikipedia.org/wiki/Cray-1 (Accessed: 16.06.2016).

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SECTION 8. Architecture and construction.

THE CALCULATION OF THE RESISTANCE OF TRANSESSUALE TURN

Abstract: *Calculations based on the rolling resistance of the rollers, the friction rollers on the ground with the shift to perpendicular to the flow direction, the frictional resistance in the device of the formation of a cushion of soil over the trench, the Total moment of forces of resistance of the basic machine-turn.*

Key words: *transessuali, resistance, supply, construction, backfilling, trench, reliability, durability.*

Language: *Russian*

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РАСЧЕТ СОПРОТИВЛЕНИЯ ТРАНШЕЕЗАСЫПАТЕЛЯ ПОВОРОТУ

Аннотация: *Выполнены расчеты по сопротивлению качению опорных катков, сопротивление трения катков о грунт при сдвиге в перпендикулярном подаче направлении, сопротивление трения в устройстве формирования валика грунта над траншеей, Общий момент сил сопротивления базовой машины повороту.*

Ключевые слова: *траншеезасыпатель, сопротивление, подача, конструкция, засыпка, траншея, надежность, долговечность.*

Расчетная схема сопротивления повороту приведена на рисунках 1, 2 и 3. В процессе работы базовая машина испытывает действие бокового усилия, создаваемого внешним сопротивлением рабочему движению рабочего органа. Это сопротивление составляет сумма усилий резания грунта, сопротивления трения перемещению разработанного грунта в процессе его транспортирования в траншею и сопротивления разгрузки рабочего органа с формированием валика грунта над траншеей. Оно направлено перпендикулярно направлению движения подачи рабочего органа и противоположно – его рабочему движению.

Так как это усилие приложено к элементам траншеезасыпателя, расположенным на значительном расстоянии впереди базовой машины, оно создает вращающий момент ее поворота вокруг центра С.

Во избежание нарушения условий нормальной работы рабочего органа и всего оборудования в целом, возможность поворота траншеезасыпателя.

Проверка может быть выполнена расчетными методами. При этом тангенциальное усилие $P_{TГ}$ создающее вращающий момент поворота, определится по формуле:

$$P_{TГ} = P_{PЗ} + P_{PЛ} + P_T + P_B \qquad (1)$$

где $P_{PЗ}$ – сопротивление резанию грунта зубцами. Его наибольшее значение получается при разработке грунта кавальера III категории. $P_{PЗ} \approx 19{,}49 кН$ [1,стр.54];

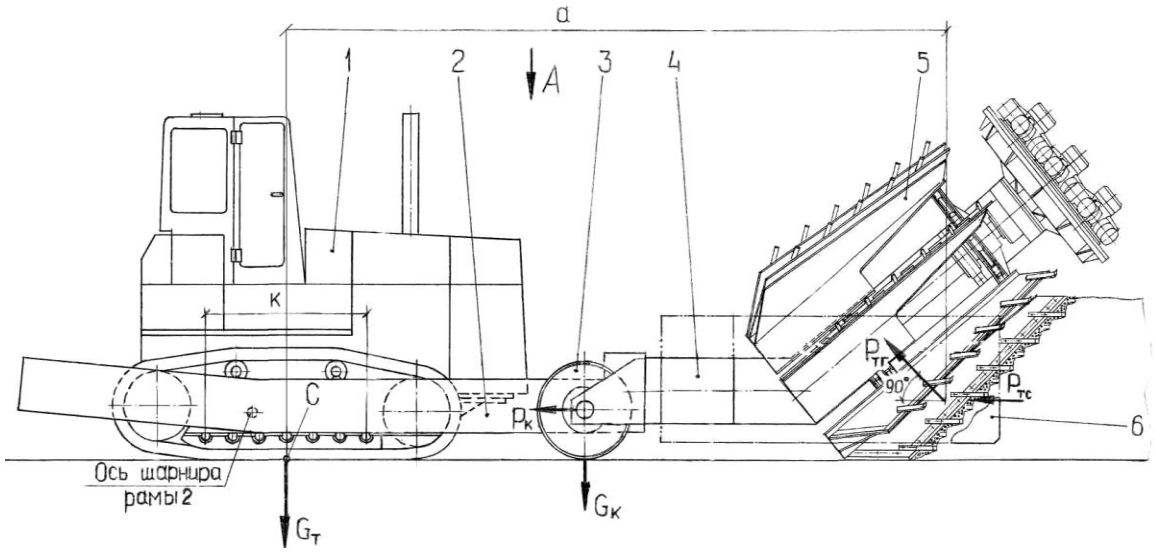
$P_{PЛ}$ – сопротивление резанию грунта лопастями рабочего органа, $P_{PЛ} \approx 42{,}45 кН$ [2,стр.70];

P_m – сопротивление трения по грунту перемещаемого рабочим органом объема грунта, $P_T \approx 16{,}61 кН$ [2, стр.82];

P_B – сопротивление разгрузки рабочего органа, в результате которой формируется валик грунта над траншеей, $P_B \approx 4{,}87 кН$ [2,стр.70].

Следовательно,

$P_{TГ} = 19{,}45 + 42{,}45 + 16{,}61 + 4{,}87 = 83{,}42 кН$



1 – базовая машины – трактор Т-25.01Я; 2 – рама толкающая; 3 – каток опорный; 4 – траверса; 5 – рабочий орган; 6 – устройство формирования валика грунта над траншеей

Рисунок 1 – Траншеезасыпатель. Схема к расчету сопротивления повороту.

Повороту базовой машины препятствуют другие внешние нагрузки, создающие вращающие моменты противоположного направления – технологическое сопротивление внедрению режущих элементов рабочего органа в грунт P_{TC}, сопротивление качению опорных катков рабочего органа в направлении подачи P_K, сопротивление трения катков сдвигу от трения в перпендикулярном подаче направлении P_{TK}, сопротивление трения в устройстве формирования валика грунта над траншеей $P_{ФВ}$.

При этом создаваемый внешними нагрузками суммарный момент сил поворота базовой машины определится по формуле:

$$M_{ПОВ} = P_{ТГ} \cdot a - (P_{TC} + P_K) \cdot в - P_{TK} \cdot c - P_{ФВ} \cdot d \quad (2)$$

в которой *a, в, c, d* – плечи приложения соответствующих нагрузок относительно центра С потенциального поворота трактора. Как определено ранее, P_{TC}=*24,67 кН* [3,стр.77].

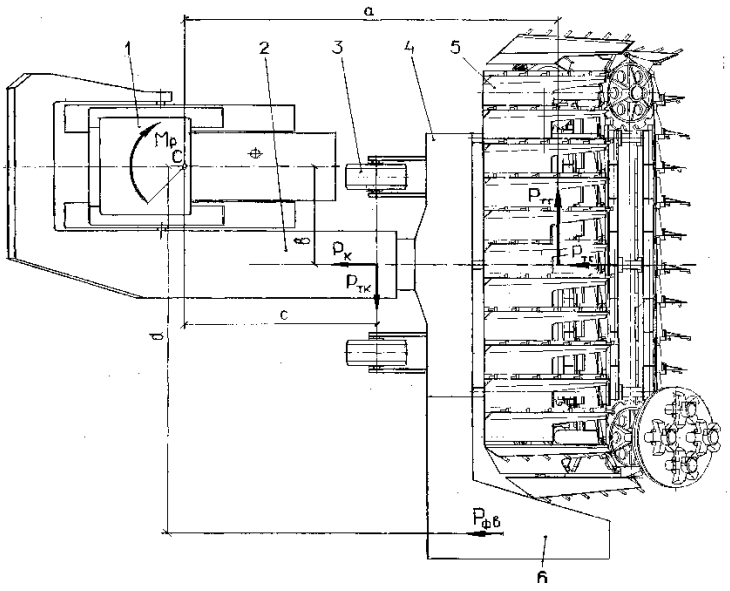


Рисунок 2 – Расчетная схема сопротивления повороту. Вид А на рисунке 1.

Сопротивление качению опорных катков

$$P_K = \mu_K \cdot G_K \quad (3)$$

где μ_K=0,2 – коэффициент сопротивления движению опорных катков траншеезасыпателя [1, стр.98].

G_K - нагрузка на опорные катки

$$G_K = G'_{PO} \cdot \frac{l_1}{l_2} = 66 \cdot 2 = 132кН$$

G'_{PO} - часть силы тяжести рабочего органа, воспринимаемая опорными катками. Принимается $G'_{PO} = 0,6 \cdot G_{PO} = 0,6 \cdot 110 = 66кН$

l_1 ,l_2 – расстояние от оси шарнира толкающей рамы 2 до центра тяжести рабочего органа 5 и до оси вращения катков 3.

$$\frac{l_1}{l_2} \approx 2$$

Следовательно, $P_K = 0,2 \cdot 132 = 26,4кН$.

Сопротивление трения катков о грунт при сдвиге в перпендикулярном подаче направлении

$$P_{TK} = f_{TP} \cdot G_K = 0,7 \cdot 132 = 92,4кН \quad (4)$$

где: f_{TP} - коэффициент трения скольжения катков по грунту [1, стр. 257].

Сопротивление трения в устройстве формирования валика грунта над траншеей $P_{ФВ}$=10,0кН.

Плечи приложения нагрузок имеют следующие величины:

а=8,7; *в*=2,3 м ; с=4,2 м; d=8,6м;

После подстановки в формулу (2) этих данных получается:

$$M_{ПОВ} = 83,42 \cdot 8,7 - (24,67 + 26,4) \cdot 2,34 - 92,4 \cdot 4,2 - 10 \cdot 8,6 = 725,75 - 119,5 - \\ - 388,08 - 86 = 132,17кН \cdot м$$

Препятствующей повороту момент реакции базовой машины M_p определяется из следующего (рисунок 2).

Силы тяжести трактора G_T, равномерно распределенная между опорными катками гусениц, создает на гусенице под каждым из катков локальное усилие трения, препятствующее повороту.

$$P_1 = \mu \cdot G_1 = \mu \cdot \frac{G_T}{n_K} = 0,7 \cdot \frac{313}{14} = 15,65кН \quad (5)$$

где G_1 - нагрузка на один каток от силы тяжести трактора;

G_T - сила тяжести трактора;

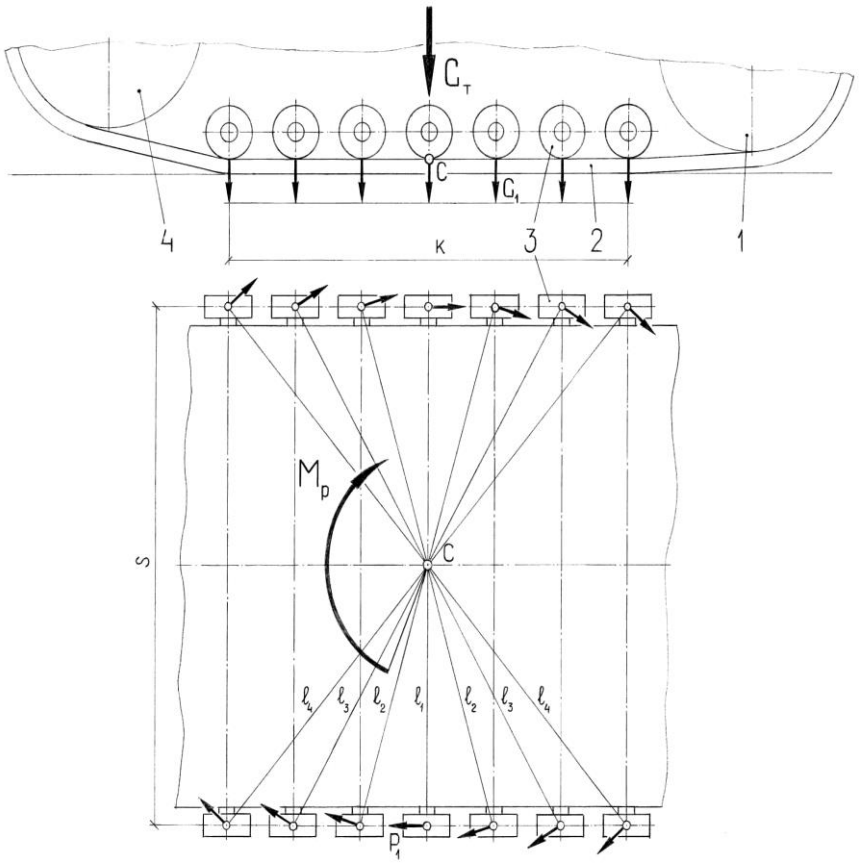
n_K - число опорных катков; Для трактора Т-25.01Я $G_T = 313кН$; $n_K = 14$;

μ - коэффициент трения; $\mu = (0,7 \div 1,0)$ [1, стр.257]

При этом каждым катком создается единичный момент силы трения относительно центра С

$$\mu = P_1 \cdot l_i \quad (5)$$

где l_i - плечо приложения силы трения, создаваемый каждым отдельным катком, относительно центра С.



1 – звездочка передняя; 2 – гусеница; 3 – каток опорный; 4 – звездочка задняя

Рисунок 3 – К расчету момента сил сопротивления базовой машины повороту.

Общий момент сил сопротивления базовой машины повороту определяется по формуле:

$$M_P = \sum_{i=1}^{n_K} M_i = \sum_{i=1}^{n_K} P_1 \cdot l_i \qquad (6)$$

Плечи l_i приложения сил трения P_1 определяются из соотношений:

$$l_1 = \frac{S}{2} = 1{,}15 м,$$

где S – межосевое расстояние гусениц трактора. Для трактора Т-25.01Я; S=2,3 м;

$$l_2 = \sqrt{\left(\frac{S}{2}\right)^2 + \left(\frac{K}{n_n}\right)^2} \qquad (7)$$

где n_n – число промежутков между катками гусеницы:

$$n_n = \frac{n_K - 2}{2} = \frac{14-2}{2} = 6$$

к – межосевое расстояние между крайними катками гусеницы. Для трактора Т-25.01 Я *к=2,04 м*;

$$l_3 = \sqrt{\left(\frac{S}{2}\right)^2 + \left(\frac{2K}{n_n}\right)^2} \qquad (8)$$

$$l_4 = \sqrt{\left(\frac{S}{2}\right)^2 + \left(\frac{3K}{n_n}\right)^2} \qquad (9)$$

После подстановки данных получается, что

$$l_2 = \sqrt{1{,}15^2 + 0{,}34^2} \approx 1{,}2 м;$$

$$l_3 = \sqrt{1{,}15^2 + 0{,}68^2} \approx 1{,}34 м;$$

$$l_4 = \sqrt{1{,}15^2 + 1{,}02^2} \approx 1{,}54 м;$$

и M_p определяется по формуле:

$$M_P = z \cdot P_1 \cdot l_1 + 4P_1 \cdot l_2 + 4P_1 \cdot l_3 + 4P_1 \cdot l_4 = \mu G_1 \cdot (2l_1 + 4l_2 + 4l_3 + 4l_4) = \\ = 0{,}7\frac{313}{14}(2 \cdot 1{,}15 + 4 \cdot 1{,}2 + 4 \cdot 1{,}34 + 4 \cdot 1{,}54) = 15{,}65 \cdot 18{,}62 = 291{,}4кн \cdot м \quad (10)$$

Следовательно, M_P больше, чем $M_{пов}$ более, чем в 2 раза, что при постоянном контакте всех 14 катков трактора с гусеницами обеспечивает надежное сопротивление повороту.

Однако, в движении может оказаться, что при выезде на выпуклый участок пути два крайних катка каждой гусеницы приподнимутся и выйдут из контакта с гусеницей. При этом сопротивление повороту обеспечивают только 10 катков.

Тогда

$$P_1 = \mu\frac{G_T}{10} = 0{,}7 \cdot \frac{313}{10} = 21{,}91кН$$

и

$$M_P = P_1 \cdot (2l_1 + 4 \cdot l_2 + 4l_3) = 21{,}91(2{,}3 + 4{,}8 + 5{,}6) = 21{,}91 \cdot 12{,}46 = 273кН \cdot м$$

В случае, если из контакта с гусеницами выйдут еще 2 пары катков

$$P_1 = \mu\frac{G_T}{6} = 0{,}7 \cdot \frac{313}{6} = 36{,}52кН$$

и

$$M_P = P_1 \cdot (2l_1 + 4 \cdot l_2) = 36{,}52(2{,}3 + 4{,}8) = 36{,}52 \cdot 7{,}1 = 259{,}29кН \cdot м$$

Следовательно, и в случаях нарушения контакта части катков с гусеницами сопротивление повороту надежно обеспечивается. И только при внезапном резком возрастании тангенциального усилия P_{TT} (например, при наличии в грунте кавальера крупных камней, металлических предметов или кусков древесины) восстановление сопротивления повороту потребует вмешательства машиниста.

Тракторы Т35.01Я, Т-40.01Я и Т-50.01К имеют значительно большие конструктивную массу, а также размеры узла опорных катков, чем у трактора Т-25.01Я. В связи с этим, их сопротивление повороту еще более велико, и его проверка не требуется.

Однако, трактор Т-11.01Я имеет конструктивную массу 14280 кг, силу тяжести $G_T \approx 142{,}8кН$ при числе опорных катков $n_к$=12 и параметрах опорного узла к=1,65 и S=1,88 м

и

Для этого трактора

$$P_1 = \mu\frac{G_T}{n_K} = 0{,}7 \cdot \frac{142{,}8}{12} = 8{,}33кН$$

$$l_1 = \sqrt{\left(\frac{S}{2}\right)^2 + \left(\frac{K}{2n_n}\right)^2}\ n_n = \frac{12-2}{2} = 5$$

$$l_1 = \sqrt{\left(\frac{1{,}88}{2}\right)^2 + \left(\frac{1{,}65}{2 \cdot 5}\right)^2} = \sqrt{0{,}94^2 + 0{,}165^2} \approx 0{,}95м;$$

$$l_2 = \sqrt{\left(\frac{S}{2}\right)^2 + \left(\frac{1{,}5K}{n_n}\right)^2} = \sqrt{0{,}94^2 + 0{,}495^2} \approx 1{,}06м;$$

$$l_3 = \sqrt{\left(\frac{S}{2}\right)^2 + \left(\frac{2{,}5K}{n_n}\right)^2} = \sqrt{0{,}94^2 + 0{,}825^2} \approx 1{,}25м;$$

и

$$M_P = P_1 \cdot (4l_1 + 4 \cdot l_2 + 4l_3) = 8{,}33(4 \cdot 0{,}95 + 4 \cdot 1{,}06 + 4 \cdot 1{,}25) = 8{,}33 \cdot 13{,}04 = = 108{,}62кН \cdot м$$

Так как $M_P \langle M_{пов}$ сопротивление этого трактора повороту не обеспечено, и его использование в качестве базовой машины траншеезасыпателя не может быть рекомендовано.

Трактор Т-20.01Я имеет конструктивную массу 24650 кг, силу тяжести $G_T \approx 246{,}5кН$ при числе опорных катков $n_к$=14 и параметрах опорного узла *к=1,98* и *S=2,1м.*

Для этого трактора

$$P_1 = \mu\frac{G_T}{n_K} = 0{,}7 \cdot \frac{246{,}5}{14} = 12{,}325кН$$

$$l_1 = \frac{S}{2} = \frac{2{,}1}{2} = 1{,}05м\ ;\ n_n=6;\ \frac{к}{n_n} = \frac{1{,}98}{6} = 0{,}33м$$

$$l_2 = \sqrt{\left(\frac{S}{2}\right)^2 + \left(\frac{K}{n_n}\right)^2} = \sqrt{1{,}05^2 + 0{,}33^2} \approx 1{,}1м;$$

$$l_3 = \sqrt{\left(\frac{S}{2}\right)^2 + \left(\frac{2K}{n_n}\right)^2} = \sqrt{1{,}05^2 + 0{,}66^2} \approx 1{,}24м;$$

$$l_4 = \sqrt{\left(\frac{S}{2}\right)^2 + \left(\frac{3K}{n_n}\right)^2} = \sqrt{1{,}05^2 + 0{,}99^2} \approx 1{,}42м;$$

и

$$M_P = P_1 \cdot (2l_1 + 4 \cdot l_2 + 4l_3 + 4l_4) = 12{,}325(2 \cdot 1{,}05 + 4 \cdot 1{,}1 + 4 \cdot 1{,}24 + 4 \cdot 1{,}42) = 12{,}325 \cdot 17{,}14 = 211{,}25кН \cdot м$$

Для этого трактора $M_P \rangle M_{пов}$, в связи с чем его сопротивление повороту обеспечено. Трактор может использоваться в качестве базовой машины траншеезасыпателя.

References:

1. (1972) Dorozhnye mashiny, chast'1. Mashiny dlya zemlyanykh rabot / Alekseeva T.V. i dr. – Moscow: Mashinostroenie, 1972.
2. Rumyantsev VA, Figlin IZ (1980) Transheynye ekskavatory – Moscow: Mashinostroenie, 1980.
3. Spivakovskiy AO, D'yachkov VK (1983) Transportiruyushchie mashiny. – Moscow: - Mashinostroenie, 1983.
4. Anur'ev VI (1978) Spravochnik konstruktora – mashinostroitelya. Tom 1 – Moscow: Mashinostroenie, 1978.
5. Balovnev VI (1981) Modelirovanie protsessov vzaimodeystviya so sredoy rabochikh organov dorozhno-stroitel'nykh mashin. – Moscow:Vysshaya shkola, 1981.
6. (1987) Bul'dozery i rykhliteli / Zakharchuk B.Z. i dr. – Moscow: - Mashinostroenie, 1987
7. Vayskrants VM (1983) Povyshenie effektivnosti ispol'zovaniya mashin dlya zemlyanykh rabot v usloviyakh zharkogo klimata - .: Stroyizdat, 1983.
8. (1978) Mashiny dlya stroitel'stva i soderzhaniya dorog i aerodromov/Sharts A.Z. i dr. – Moscow: Mashinostroenie, 1978.
9. (1986) Mashiny i oborudovanie dlya stroitel'stva meliorativnykh sistem. Otraslevoy katalog – Moscow: TsNIITEStroyMash,1986.
10. Mentyukov VP (1971) Zemlyanye raboty na stroitel'stve magistral'nykh truboprovodov. – Moscow: Nedra, 1971.

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DIGITAL FILTERING AND WAVELET PROCESSING OF SIGNALS OF CHEMICAL ANALYTICAL SYSTEMS

Abstract: *There are cosidered questions of spectral representation and processing of signals of chemical-analytical complexes with using of wavelet-technologies*

Key words: *chemical-analytical complexes, wavelet-technologies, synthesis of orthogonal basis*

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ЦИФРОВАЯ ФИЛЬТРАЦИЯ И ВЕЙВЛЕТ ОБРАБОТКА СИГНАЛОВ ХИМИКО-АНАЛИТИЧЕСКИХ КОМПЛЕКСОВ

Аннотация: *Рассматриваются вопросы спектрального представления и обработки сигналов химико-аналитических комплексов, с использованием вейвлет технологий.*

Ключевые слова: *химико-аналитические комплексы, вейвлет технологии, синтез ортогонального базиса.*

Современные аналитические приборы: хроматографы, спектрофотометры, рентгено-флуориметры и др. определяют состав наземных экоаналитических лабораторий экологического мониторинга. В настоящее время приборо-строители предприняли переход от производства аналитических приборов к серийному выпуску многоцелевых компьютеризованных химико-аналитических комплексов (ХАК) типа «ИНЛАН» (ИНЛАН - сокращенно от интеллектуального лабораторного анализа). ХАК - определяется как сертифицированная совокупность материальной (средства измерений, вычислительная техника, стандартные образцы, вспомогательное оборудование и т.п.), а также интеллектуальной (методики, программный продукт, эргономика) составляющих химического анализа [1]. Таким образом, в одном комплекте системно объединены

непосредственно приборы, программно-математическое обеспечение (ПМО), средства метрологического обеспечения, комплект методик анализа и все периферийные устройства, необходимые для реализации этих методик. Аналитические комплексы не просто позволяют заменить одни приборы на другие, более совершенные, а создают в экоаналитических лабораториях новую технологическую среду, позволяющую превратить химико-аналитические лаборатории в подобие производственных участков, дающих быстро и дешево химико-аналитическую информацию. Существенного эффекта повышения качества аналитических измерений с наименьшими затратами ресурсов достигается за счет использования соответствующего ПМО. Таким образом, вопросы разработки новых алгоритмов ПМО, как наиболее динамичной составляющей ХАК, остаются актуальными.

Значительный неослабевающий интерес в мире к представлению сигналов в базисе всплесков (wavelets) обусловлен главным образом их приложениями к проблемам сжатия и обработки информации (аудио и графической). В настоящее же время построение новых базисов с нужными свойствами можно считать требующим определенных навыков ремеслом. Аппарат базисов всплесков оказался одинаково продуктивен, как для чисто теоретических вопросов, так и для прикладных. Оказалось, что существует множество базисов, хорошо локализованных по пространству, чьи преобразования Фурье также хорошо локализованы. При этом оказалось, что степенью локализации во временной и частотной области можно управлять, что дает возможность получить своеобразную интерполяцию между представлением функции (сигнала) во временной (или пространственной) области и ее представлением в частотной области, т.е. ее представлением через преобразование Фурье [2,3].

Обобщением гармонического анализа является применение для представления сигнала *S(t)* в виде ряда или интеграла других систем функций. Такими функциями, в принципе могут быть любые системы линейно независимых функций *{g(k,t), k=1,2,…,N}* и тогда сигнал *S(t)* можно представить в виде:

$$S(t) = \sum_{k=1}^{N} S(k) g(k,t) \qquad (1)$$

$$S(k) = \int_T S(t) G(k,t) dt = \int_T S(t) \sum_{i=1}^{N} B_{k,i} g(i,t) dt \qquad (2)$$

Функции *g(k,t)* называются базисными, а *G(k,t)* – взаимными (дуальными) базисными функциями:

$$G(k,t) = \sum_{i=1}^{N} B_{k,i} g(i,t) \qquad (3)$$

Дискретное преобразование выходного сигнала аналитического прибора *y(t)* будем рассматривать как разложение вида (1) непрерывного сигнала на конечном интервале времени по системе непрерывных функций *{g(k,t)}*. Совокупность коэффициентов такого разложения является дискретным аналогом сигнала – его спектром.

1. Проектирование вейвлетов для обработки сигналов ХАК, специальные условия[4-7].

Существует значительное количество систем базисных функций, удовлетворяющих общим требованиям, предъявляемым к базисам и обеспечивающим необходимое разложение *y(t)* [3]. Однако из всего их многообразия целесообразно выбрать такие функции, которые отвечали бы некоторым дополнительным условиям, вытекающим из характера обработки выходного сигнала аналитического прибора. Это, прежде всего [4]:

а) повышение отношения сигнал/помеха;

б) некоррелированность коэффициентов разложения;

в) улучшение разделения полезных компонентов сигнала.

Выполнение этих требований позволило бы упростить алгоритмы обработки и улучшить качество получаемых оценок.

Обозначим такую систему базисных и взаимных базисных функций через *{φ(k,t), Φ(k,t)}*. Чтобы в пространстве, натянутом на базисные функции, компоненты сигнала были различимыми (желательно – разделенными), базисные функции должны зависеть от существенного параметра *l*. В дискретном представлении сигнала, система базисных функции в качестве аргумента содержит квантованные значения параметра *l=kΔl*. Величина k определяет номер функции и введена в ее обозначение в виде параметра.

Максимальное отношение сигнал/помеха в спектральной области предполагает, что каждая взаимная базисная функция *Φ(k,t)*, с помощью которой по выражению, аналогичному (2), вычисляется спектр сигнала *S(k)*, должна удовлетворять уравнению согласованной фильтрации:

$$\int_T B(t,\tau)\Phi(k,\tau)d\tau = f(k,t) \qquad (4)$$

где *f(k,t)* – модель сигнала, у которого некоторый (существенный) параметр *l=kΔl*: *Δl*-шаг квантования по оси *l*.

Из (4) следует, что функции *{f(k,t), k=1,2,…,N}*, так же как и функции *Φ=(k,t)*, должны образовывать упорядоченную по значениям *kΔl* систему (т.е. образованы сдвигом *Δl* модели сигнала по оси *l*), при фиксированном на некотором уровне (точнее – на уровне параметров сигнала) векторе остальных параметров. Как

правило, вследствие конечной длительности сигнала существенный параметр входит в модель, описывающую сигнал, нелинейно. Поэтому система функции *{f(k,t)}* будет линейно – независимой.

Некоррелированность коэффициентов достигается при каноническом разложении случайного процесса. Каноническое разложение процесса *y(t)* с корреляционной функцией $B(t,\tau)$ обеспечивается, если базисные функции $\{\varphi(k,t),\Phi(k,t)\}$ удовлетворяют уравнению:

$$\varphi(k,t)=\frac{1}{\sigma_k^{\,2}}\int_T B(t,\tau)\Phi(k,\tau)d\tau, \qquad (5)$$

где

$$\sigma^2{}_k=\int\int_T B(t,\tau)\Phi(k,t)\Phi(k,\tau)dtd\tau \qquad (6)$$

σ_k^2 имеет смысл дисперсии *k*-ой спектральной составляющей.

Сравнивая выражения (5) (6), можно видеть, что для удовлетворения обоих вышеуказанных требований между функциями *f(k,t)* и базисом $\varphi(k,t)$ должна существовать линейная зависимость:

$$f(k,t)=\sigma_k^2\varphi(k,t) \qquad (7)$$

Тогда по (5), взаимный базис $\Phi(k,t)$ будет равен:

$$\Phi(k,t)=\frac{1}{\sigma_k^2}\sum_{i=1}^{N}\upsilon_{ki}f(i,t) \qquad (8)$$

Подставляя в это выражение $f(i,t)$ из (4), получим

$$\Phi(k,t)=\frac{1}{\sigma_k^2}\sum_{i=1}^{N}\upsilon_{ki}\int_T B(t,\tau)\Phi(i,\tau)d\tau \qquad (9)$$

Следовательно, базисная система функций $\{\varphi(k,t);\ \Phi(k,t)\}$, позволяющая обеспечить согласованную фильтрацию и некоррелированность спектральных отсчетов, должна удовлетворять уравнениям (8) и (9). В частности, искомым решением является базисная система, образованная собственными функциями уравнения

$$\int_T B(t,\tau)\Phi(i,t)d\tau=\lambda_i\Phi(i,t).$$

Такая базисная система предполагает разложение, известное как разложение Карунена-Лоэва [2]. При этом $\vartheta_{k,i}$ образуют диагональную матрицу с элементами $\vartheta_{kk}=\lambda_k^{-1}\sigma_k^2$. Это приводит, как следует из (8) и (9), к тому, что взаимный базис оказывается линейно связанным с моделью сигнала $f(k,t)$, а значит, система функций $\{f(k,t)\}$ должна образовывать взаимный базис. Однако реальные сигналы аналитических приборов, а значит и их модели, таким свойством не обладают.

Таким образом, построить базисную систему, удовлетворяющую одновременно всем требованиям, невозможно и имеет смысл рассматривать возможность построения базисных систем, близких к оптимальным.

Ортогональные системы базисных функций, предназначенные для обработки выходных сигналов ХАК и, в совокупности, удовлетворяющие перечисленным требованиям (а-в), назовем ***вэйвлет базисными системами*** (ВБС).

2. Синтез вейвлетных систем, удовлетворяющих условию некоррелированности и максимизации отношения сигнал/помеха в спектральных отсчетах[8-10].

Рассмотрим синтез ортогонального базиса, близкого к оптимальному базису Карунена-Лоэва, отвечающего требованиям некоррелированности и максимизации отношения сигнал/помеха спектральных составляющих сигнала. Для этого введем систему линейно-независимых функций $\{U(k,t)\}$ удовлетворяющих уравнению, аналогичному (4):

$$\int_T B(t,\tau)U(k,\tau)d\tau=f(k,t) \qquad (10)$$

и на их основе построим систему базисных функций *{φ(k,t)Φ(k,t)}* удовлетворяющих условию (5), воспользовавшись процедурой, аналогичной ортогонализации по Грамму-Шмидту [3]. Положим, что *Φ(1,t)=U(1,t).* Тогда *φ(1,t)* вычисляется по (5) и (6) при *k*=1 и известной *Φ(1,t):*

$$\varphi(1,t)=\frac{1}{\sigma_1^2}\int_T B(t,\tau)\Phi(1,\tau)d\tau$$

затем полагаем, что

$$\Phi(2,t)=U(2,t)-\gamma_{21}\Phi(1,t),$$

где из обеспечения условия взаимной ортогональности *Φ(2,t)* и *φ(1,t)* коэффициент γ_{21} выбирается равным:

$$\gamma_{21}=\int_t U(2,t)\varphi(1,t)dt=\frac{1}{\sigma_1^2}\int_t f(2,t)\Phi(1,t)dt$$

Вторая функция *φ(2,t)* находится аналогично по (5) и (6) при *k*=2 и известной *Φ(2,t).* Продолжая

процедуру далее, получим для k-ой функции $\Phi(k,t)$ выражение:

$$\Phi(k,t) = U(k,t) - \sum_{k=\tau}^{k-1} \gamma_{k\tau} \Phi(\tau,t) \qquad (11)$$

где

$$\gamma_{k\tau} = \int_T U(k,t)\varphi(\tau,t) = \frac{1}{\sigma_2^2}\int_T f(k,\tau)\Phi(\tau,\tau)d\tau\,,\ \mathrm{k}>\tau \qquad (12)$$

а $\varphi(\tau,t)$ определяется по (5) с учетом (6), (11).

Отметим что в случае комплексной системы функций $\{U(k,t)\}$ получаем комплексный базис и в (12) следует подставлять вместо $\varphi(\tau,t)$ комплексно-сопряженную с ней функцию $\varphi^*(\tau,t)$. Если система функций $\{U(k,t)\}$ ортогональна, то, естественно, $\gamma k\tau=0$ и $\Phi(k,t)=U(k,t)$. Иногда удобно иметь не рекуррентное, как (11), а явное выражение функций $\Phi(k,t)$ через функции $U(\tau,t)$. При этом $\Phi(k,t)$ можно представить в виде:

$$\Phi(k,t) = U(k,t) - \sum_{\tau=1}^{k} d_{k\tau} U(\tau,t) \qquad (13)$$

где

$$d_{k\tau} = -(\gamma_{k\tau} - \sum_{i=\tau}^{k-1} \gamma_{ki} d_{i\tau})\,,\ \tau = \overline{1,k-2}; \qquad (14)$$

$$d_{k,k-1} = -\gamma_{k,k-1};\ d_{kk} = 1$$

Из приведенной процедуры вытекает, что выбор функций $\{U(k,t),\ k = \overline{1,N}\}$ однозначно определяет искомую базисную систему. Учитывая специфику ее определения, назовем эту систему вэйвлет базисной системой (ВБС) и в дальнейшем, если нет специальных оговорок, под ВБС будем понимать базисные системы, построенные по изложенной методике.

Таким образом, $\varphi(k,t)$ и $\Phi(k,t)$ на основании (5), (11) и (13) будут иметь вид:

$$\Phi(k,t) = U(k,t) - \sum_{k=\tau}^{k-1} \gamma_{k\tau}\Phi(\tau,t) = \sum_{k=\tau}^{k-1} d_{k\tau} U(\tau,t)$$

$$\varphi(k,t) = \frac{1}{\sigma_k^2}\int_T B(t,\tau)\Phi(k,\tau)d\tau = \frac{1}{\sigma_k^2}\sum_{\tau=1}^{k} d_{k\tau} f(\tau,t) \qquad (15)$$

где $\varphi_{k\tau}$ и $d_{k\tau}$ определяется по (12) и (14) а $U(k,t)$ является решением уравнения (10).

В заключение отметим, что именно учет специфики коэффициентов $d_{k\tau}$ позволяет оценить преимущества вейвлет представления и предложить быстрые и экономные алгоритмы обработки в спектральной области. Теоретически МНК оценки параметров сигналов в таких вейвлет представлениях должны приближаться к оптимальным, если предположения о моделях сигналов и шума соответствуют реалиям.

References:

1. Buzanovskii VA, Rizhnev VU, et al. (2000) Rossiiskie ekoanaliticheskie kompleksi // Ekologiya i promishlennost Rossii. №1, pp.4-9.
2. Petuhov AP (1999) Vvedenie v teoriiu bazisov vspleskov. - SPb:Izd-vo SPbGTU, – 132p.
3. Novikov LV (2007) Obrabotka signalov na osnove ortonormirovannih kvaziveivletov // Priborostroenie: Izv. Vuzov. T.50, №1. pp.3-10.
4. Tulenbaev MS (2008) Modelirovanie signalov himiko-analiticheskih kompleksov ekologicheskogo monitoringa. //Vestnik TarGU imeni M.H. Dulati "Prirodopolzovanie i problemi antroposferi", - №3.- pp.291-294.
5. Tulenbaev MS (2009) Veivlet predstavlenie signalov himiko-analiticheskih kompleksov ekologicheskogo monitoringa // Nauka i inzhenernoe obrazovanie bez granic: trudi. mezhdunar. foruma (KazNTU, 13-14 november 2009) - Almati, 2009. - T. 2. - pp. 211-214.
6. Tulenbaev MS (2009) Veivlet-podobnie bazisi ortogonalnogo razlozheniya signalov v informacionnih sistemah ekologicheskogo monitoringa // VI Dulatovskie chteniya: mater.Mezhdunar. nauch.-prakt. konf. – Taraz, 2009 – CH. III. – pp. 51-54.
7. Tulenbaev MS, Rusinov LA (2010) Veivlet predstavleniya signalov analiticheskih kompleksov ekologicheskogo monitoringa // Dni nauki-2010: materiali VI Mezhdunar. nauch.-prakt. konf. CHehiya (march, 2010). – Praga, 2010. – pp. 50-52.
8. Tulenbaev MS (2010) Spektralnie agoritmi obrabotki signalov himiko-analiticheskih kompleksov v geoinformacionnih sistemah ekomonitoringa. // Vestnik NAN RK – Almati, 2010 – №1 – pp.11-17.
9. Tulenbaev MS, Beglerova ST, Taszhurekova ZK (2011) Issledovanie algoritmov obrabotki ekoanaliticheskih dannih na osnove kompiuternogo imitaciionnogo modelirovaniya.// "Vestnik KazNTU im. K.I.Satpaeva" - Almati, №3 (85) - pp.227-231.
10. Tulenbaev MS, Beglerova ST, Taszhurekova ZK (2011) Vibor porozhdaiushih funkcii kvaziveivletov v himiko-analiticheskih informacionnih sistemah ekologicheskogo monitoringa. // "Vestnik KazNTU im. K.I.Satpaeva", – Almati, – №3 (85) – pp.232-238.

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SECTION 7. Mechanics and machine construction.

THE RESULTANT CUTTING FORCE DURING THE CYLINDRICAL MILLING

Abstract: *The character of the change of the resultant cutting force in depending from the length of milling of the flat surface of the cylindrical milling cutter with helical cutting teeth is considered.*

Key words: *a resultant cutting force, a length of milling, a cylindrical milling cutter, a billet.*

Language: *Russian*

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РАВНОДЕЙСТВУЮЩАЯ СИЛА РЕЗАНИЯ ПРИ ЦИЛИНДРИЧЕСКОМ ФРЕЗЕРОВАНИИ

Аннотация: *Рассмотрен характер изменения равнодействующей силы резания в зависимости от длины фрезерования плоской поверхности цилиндрической фрезой с винтовыми режущими зубьями.*

Ключевые слова: *равнодействующая сила резания, длина фрезерования, цилиндрическая фреза, заготовка.*

Введение

Процесс резания при цилиндрическом фрезеровании имеет циклический характер. На контактные поверхности режущего инструмента и заготовки действуют переменные силы, приводящие к отделению слоев (равных глубине резания) обрабатываемого материала: окружная сила (или сила резания), направленная по касательной и радиальная сила, направленная по радиусу [1]. Равнодействующая [2] окружной и радиальной сил равна геометрической сумме указанных сил и в свою очередь раскладывается по правилу параллелограмма [3] на две составляющие – горизонтальную и вертикальную. Горизонтальная составляющая силы резания при встречном фрезеровании представляет собой усилие, которое необходимо приложить к столу станка для осуществления рабочей подачи. Вертикальная составляющая силы резания стремится поднять закрепленную в приспособлении заготовку вместе со столом и консолью станка, тем самым вызывая вибрации оборудования [4].

Для снижения дисбаланса действующих сил, при фрезеровании плоской поверхности, цилиндрические фрезы изготавливают с винтовыми режущими зубьями.

Расчет сил резания при цилиндрическом фрезеровании по аналитическим формулам [5, 402 – 424] и трехмерное моделирование процесса обработки плоской поверхности цилиндрической фрезой позволят получить полную картину изменения величины равнодействующей силы резания и произвести корректировку выбранных режимов резания.

Материалы и методы исследования

Исследовался процесс фрезерования (с постоянной глубиной резания) плоской поверхности цилиндрической фрезой с винтовыми режущими зубьями и, в частности, изменения величины равнодействующей силы резания, посредством компьютерных программ инженерного анализа.

Режимы резания, геометрические параметры цилиндрической фрезы и обрабатываемой заготовки и другие исходные данные процесса фрезерования представлены в работе [6]:

- длина $L_з$ × ширина B × высота H обрабатываемой заготовки – 50 × 50 × 20 мм; наружный диаметр фрезы $d_ф$ – 70 мм; длина

режущей части фрезы $l_ф$ – 52 мм; общая длина фрезы $L_ф$ – 60 мм; передний угол режущего зуба фрезы γ – 10 град.; задний угол режущего зуба фрезы α – 10 град.; угол наклона винтовой режущей кромки фрезы ω – 36 град.; ширина ленточки на задней поверхности режущего зуба фрезы f – 1 мм; количество режущих зубьев фрезы – 10 шт.

- глубина резания t – 2 мм; частота вращения фрезы n – 2865 мин$^{-1}$; скорость подачи режущего инструмента s – 1000 мм/с (величина скорости подачи выбиралась при условии непродолжительного времени обработки).
- массовая плотность для материалов фрезы и заготовки ρ – 7850 кг/м^3; модуль Юнга для материалов фрезы и заготовки E – 200 ГПа; коэффициент Пуассона для материалов фрезы и заготовки μ – 0.3; предел текучести для материала заготовки σ_T – 250 МПа; касательный модуль для материала заготовки E_t – 960 МПа.

Моделирование процесса цилиндрического фрезерования и последующая обработка результатов (графическое изображение) выполнялись в программе LS-DYNA. Регрессионный анализ стабильности процесса фрезерования осуществлялся в Excel – приложении пакета Microsoft Office.

Результаты и их обсуждение

На рис. 1 представлен характер изменения величины равнодействующей силы резания от длины фрезерования плоской поверхности цилиндрической фрезой с винтовыми режущими зубьями.

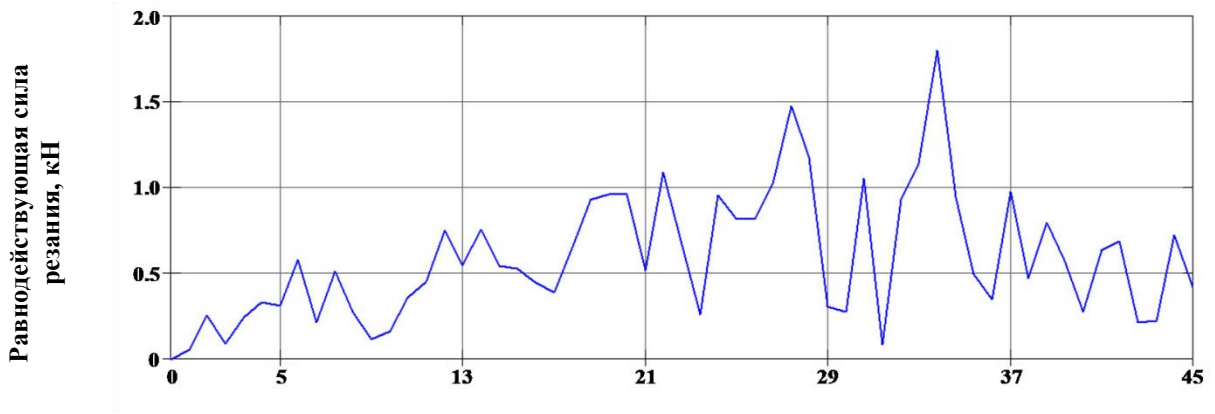

Рисунок 1 – Зависимость величины равнодействующей силы резания при цилиндрическом фрезеровании от длины обработки.

Значения равнодействующей силы по всей длине фрезерования изменяется периодически. Вследствие переменных толщины и ширины среза при цилиндрическом фрезеровании на графике можно отметить начальные точки возрастания функции (характерны для момента врезания n-ного режущего зуба цилиндрической фрезы при минимальной толщине среза) и конечные точки возрастания функции (характерны для момента выхода m-ного режущего зуба цилиндрической фрезы из материала заготовки при максимальной толщине среза). При цилиндрическом фрезеровании одновременно выполняют процесс резания несколько зубьев фрезы (их количество будет зависеть от глубины резания, наружного диаметра и общего количества зубьев режущего инструмента).

Для проведения статистического анализа результатов расчета проведем усредненные линии по максимальным и минимальным значениям равнодействующей силы резания. Средние значения наибольшей и наименьшей равнодействующей силы резания при цилиндрическом фрезеровании и линейная аппроксимация полученных зависимостей представлены на рис. 2.

На графике, рядом с соответствующими зависимостями, показаны уравнения регрессии $F_{rmax} = 0.0164L + 0.4416$ и $F_{rmin} = 0.0058L + 0.0527$, характеризующие изменения значений наибольшей и наименьшей равнодействующей силы резания при фрезеровании. В уравнениях F_{rmax} и F_{rmin} – наибольшая и наименьшая равнодействующая сила резания при фрезеровании соответственно, кН; L – длина обработки, мм.

Линии тренда (на графике прямые линии) позволяют графически отобразить направление изменения ряда данных путем аппроксимации значений [7].

Степень соответствия линий тренда расчетным зависимостям (остаточное квадратичное отклонение) характеризуется коэффициентом достоверности аппроксимации R^2. Чем больше значение R^2 (в диапазоне от 0 до

1), тем точнее линия тренда описывает изменения F_{rmax} и F_{rmin} от длины фрезерования. Сравнив значения двух коэффициентов можно сказать, что при заданных режимах фрезерования и геометрических размерах цилиндрической фрезы процесс резания происходит с некоторыми отклонениями (возрастание и убывание F_{rmax} по всей длине обработки). Среднее значение R^2 составляет 0.4547, что говорит о нестабильности процесса цилиндрического фрезерования.

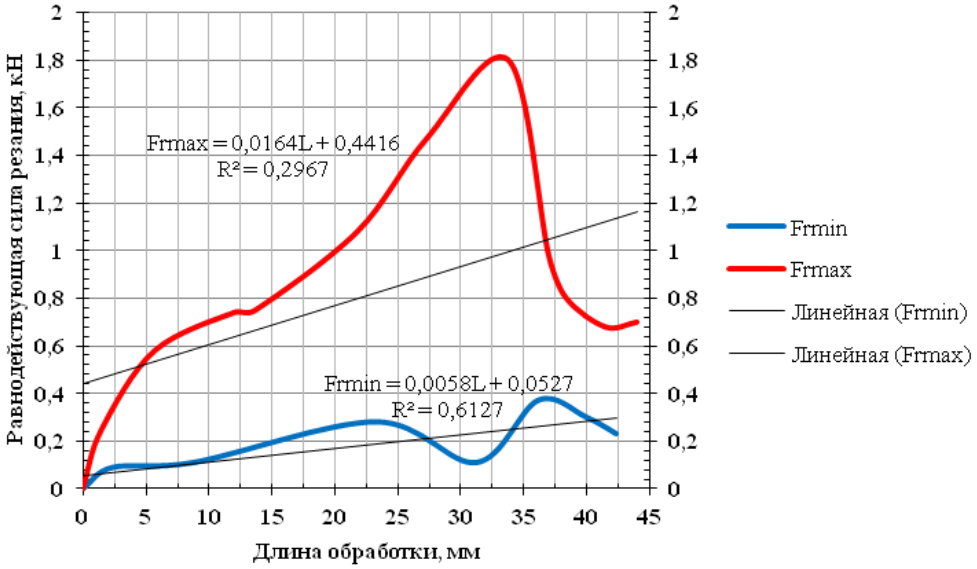

Рисунок 2 – Средние значения наибольшей и наименьшей равнодействующей силы резания при фрезеровании.

Изменение равнодействующей силы резания подчиняется некоторому циклическому закону, а это значит, что сила имеет период T, и записать функцию можно воспользовавшись рядом Фурье [8] (если функция $F(L)$ непрерывна или частично непрерывна)

$$F(L) = \frac{a_0}{2} + \sum_{n=1}^{\infty}\left(a_n \cos\frac{n\pi L}{T} + b_n \sin\frac{n\pi L}{T}\right), \quad (1)$$

где n – целое положительное число; a_0, a_n, b_n – коэффициенты Фурье, находятся как

$$a_0 = \frac{1}{T}\int_{-T}^{T} F(L)dL,$$

$$a_n = \frac{1}{T}\int_{-T}^{T} F(L)\cos\frac{n\pi L}{T}dL,$$

$$b_n = \frac{1}{T}\int_{-T}^{T} F(L)\sin\frac{n\pi L}{T}dL.$$

За период T принимается изменение равнодействующей силы резания от минимального до максимального значений при снятии одного слоя материала.

Заключение

В результате проведенного анализа процесса фрезерования цилиндрической фрезой с винтовыми режущими зубьями можно сделать следующие выводы:

1. Цикл резания материала заготовки при цилиндрическом фрезеровании характеризуется постепенным увеличением величины равнодействующей силы (увеличивается ширина среза) в зависимости от длины обработки.

2. Перед максимальным значением равнодействующей силы, сила сначала принимает минимальное значение, т. е. происходит большой скачок силы, что влияет на качество обработки поверхности (образуются ступени).

3. Сила резания оказывает воздействие на состояние режущих зубьев (затупление, выкрашивание). Поскольку эта сила неравномерная, то процесс износа цилиндрической фрезы тоже неравномерный.

References:

1. (2016) Sila rezaniya pri frezerovanii. Moschnost' rezaniya. Available: http://www.metalcutting.ru/content/sila-rezaniya-pri-frezerovanii-moshchnost-rezaniya (Accessed: 23.06.2016).
2. (2016) Ravnodeystvuyuschaya sila. Available: http://fizmat.by/kursy/dinamika/ravnodejstv (Accessed: 23.06.2016).
3. (2016) Parallelogram sil. Available: https://ru.wikipedia.org/wiki/Параллелограмм_сил (Accessed: 23.06.2016).
4. (2016) Sily, voznikayuschie pri frezerovanii. Available: http://dlja-mashinostroitelja.info/2010/07/sily_voznikayuschie_pri_frezerovanii/ (Accessed: 23.06.2016).
5. Dalsky AM, Suslov AG, Kosilova AG, Mescheryakov RK (2001) Handbook for technologist mechanical engineer. Vol. 2. M.: Engineering, 2001. – 944 p.
6. Chemezov D, Palev N (2016) The simulation of cutting process of the cylindrical milling cutter. ISJ Theoretical & Applied Science, 06 (38): 56-67.
7. Glushakov SV, Suryadny AS (2009) Microsoft Excel 2007. M.: AST: AST MOSCOW. – 512 p.
8. Hardy GG, Rogozinsky VV (2009) Fourier series. Publ.: "Librokom". – 152 p.

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SECTION 30. Philosophy.

SOME QUESTIONS OF THE DEVELOPING OF INTERETHNIC RELATIONS

Abstract: *In given article some questions on developing of the interethnic relations and also the possibility of interethnic peaceful coexistence without conflicts.*

Key words: *Interethnic relations, nation, national ethnic unity, national interests, national identity, democracy.*

Language: *English*

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Pursuing peaceful course in international relations the Republic of Uzbekistan at the same time assumes the functions of protection of life and dignity of its citizens realizes the inherent right of defense in accordance with the UN Charter, provides military power and defense capability of the state to the level of reasonable sufficiency. "In the surrounding us a troubled world – said Islam Karimov in his speech to the deputies of the Oliy Majlis – there are not only friends, but there are also those who would like to draw Uzbekistan in the sphere of its influence. They can use any methods available to them, including the military. For this we need to have a mobile, well-trained and equipped army, capable of defending our borders, our independence and sovereignty".

Preparing of young people for service in the Armed forces of the Republic of Uzbekistan is the task of national importance, in its decision an important role to play schools, lyceums, colleges, special educational institutions. In all secondary schools introduced as a compulsory subject of pre-conscription training of young men. Teachers of this subject, namely, pre-conscription training of young men and physical education prepare the Universities of the Republic of Uzbekistan.

The military-patriotic education is an integral part of youth education. The theory and practice of the military-patriotic education based on the Constitution of the Republic of Uzbekistan, ideas of the President of the Republic of Uzbekistan about patriotism and the protection of a sovereign, independent country, laws, decrees of the Oliy Majlis, decrees of the Ministry of Defense, the provisions of the military pedagogy and psychology, military science and others.

In Article 52 of the Constitution of the Republic of Uzbekistan noted, "Protection of the Republic of Uzbekistan is the duty of every citizen of the Republic of Uzbekistan". Based on this military doctrine, approved by the Oliy Majlis, determines the Main directions of preparation of economy, territory and population for defense. In particular it identifies that the military-patriotic education of the population is:

1. In the system of training of youth of premilitary age and conscripts for military service in schools and other educational institutions, organizations of the Republic of Uzbekistan.
2. The Armed Forces of the Republic of Uzbekistan with the passage of the personnel of the military service.
3. In schools, high schools, on military faculties and in military departments of civilian universities of the Republic of Uzbekistan.
4. In special forces, transmitted to the Armed Forces.

"Love to the Land, to the Motherland, noble feelings are eternal features of the national character, which has become the flesh and blood of our people. To preserve, protect and develop these valuable human qualities, to raise our children worthy sons and daughters of a free and democratic Uzbekistan – all of these would become the main directions of our

work in the field of spirituality" - said Islam Karimov.

The main principles of the military-patriotic education are:

1. The principle of scientific objectivity.
2. The principle of concrete historical approach.
3. The main tasks and directions of the military-patriotic education of students.

The main tasks of the military-patriotic education are to develop a sense of pride in our independent, sovereign, walking on its way Motherland, the love of the Armed Forces, loyalty and militant labour traditions, respect for military labour: shaping constant willingness skillfully and bravely with arms in their hands to defend our freedom and independence to perform their civic duty.

The aim of the military-patriotic education is the formation of attitudes, beliefs, world views, ensuring readiness to defend their Fatherland, to give it all the power, and if it will need even life, moral-combat qualities of future warriors.

The directions of the military-patriotic education:

1. The formation of young people moral-political and psychological qualities of defenders of the Motherland is the heart of the military-patriotic education. The formation of young people the military-patriotic education includes two elements:

– moral and political;

- psychological.

Moral and political:

1. To know the history of Uzbekistan.
2. To forme a sense of pride in our independent, sovereign, walking on his way Motherland.
3. To form the loyalty to the military and labor traditions of the Uzbek people.
4. To form a constant willingness skillfully and bravely with arms in their hands, to defend our freedom and independence, fulfilling their civic duty.
5. To form a sense of loyalty to their native places, and for this we need to know our territory, province, the village that grows to produce on their land.
6. Especially students should know about labor and combat exploits of the Uzbek people during the Second World War.
7. To form the political, moral attitudes and beliefs of students in the spirit of love and devotion to their Homeland.
8. We should always remember the words of our President – "Love for the land, the Motherland, the grateful feelings are eternal features of the national character, which has become the flesh and blood of our people. To preserve, protect and develop these valuable human qualities, to bring these valuable human qualities, to raise our children worthy sons and daughters of a free and democratic Uzbekistan – all these would be the main focus of our work in the field of spirituality".

The second direction of the military-patriotic education of military–technical direction. In the course students acquire qualities such as military knowledge, combat skills, discipline, self-discipline, strict compliance with the oath and statute.

In our country paid the great attention to the training of military personnel (staff officers). Since 1918 functioning "The Tashkent Higher combined arms school", in Chirchik – "Tank school", etc.

The great progress in the training of military personnel was the organization of the military departments, the military preparing for secondary schools, at the leading Universities of the Republic of Uzbekistan.

In our country the military-patriotic education is carried out also by specialized organizations. One of them is "Vatanparvar" ("Patriot"). Organization for promotion of defense of Uzbekistan "Vatanparvar" is a non-profit organisation, the legal form of a public Association, created on the basis of joint activity to protect common interests united the citizens by the military-media, sports-technical and military-patriotic orientation and achieve the statutory goals of the Organization.

The Charter of the organization was reregistered on May 21, 2013 the Ministry of Justice of the Republic of Uzbekistan.

The purpose of the organization to promote the defense of Uzbekistan "Vatanparvar" is to contribute to strengthening the defensive might of the Armed Forces of the Republic of Uzbekistan, training youth and citizens to work and defend the Homeland, promote through the system of their organization to the public authorities in promoting of ideas of defending the homeland among the youth and the citizens, education of youth in patriotic spirit.

To achieve the assumed objectives, the Organization performs the following tasks:

- preparation of technical military specialists for the Armed Forces, training of specialists of mass professions for the national economy;
- development and promotion of technical and applied sports in the country;
- participation together with regional, state, public and non-profit organizations in the education of youth and citizens in the spirit of patriotism, and various military-patriotic events.

Organizational-mass work, military-Patriotic activity of the Organization on the basis of the organization's Charter, Constitution and laws of the Republic of Uzbekistan, decrees of the President of the Republic of Uzbekistan and government regulations.

References:

1. Karimov IA (1997) Uzbekistan na poroge XXI veka: ugrozy bezopasnosti, uslovija i garantii progressa. - T, 1997, pp. 69.
2. (2014) Konstitucija Respubliki Uzbekistan.- Tashkent, 2014, pp. 12.
3. Karimov IA (1995) «Osnovnye principy obshhestvenno-politicheskogo i jekonomicheskogo razvitija Uzbekistana».T.; Uzbekiston, 1995 -pp.42.
4. Karimov IA (2005) Nasha glavnaja cel' - demokratizacija i obnovlenie obshhestva, reformirovanie i modernizacija strany. T.: IPTD « Uzbekiston, 2005. -pp.29.
5. Karimov IA (2008) Juksak ma#navijat - engilmas kuch. - Toshkent: Ma#navijat, 2008
6. (2012) Mezhnacional'nye otnoshenija bez konfliktov. Sost.: Brod A.S. i dr. – Moscow: Academia, 2012. – 640 p.
7. Ata-Mirzaev O, Gentshke V, Murtazaeva R (1998) «Uzbekistan mnogonacional'nyj: istoriko-demograficheskij aspekt» T, 1998, p.112.
8. Ata-Mirzaev OB (2009) Narodonaselenie Uzbekistana: istorija i sovremennost'.-T.: izhtimoij fikr, 2009. -pp.149.
9. Gellner J (1989) Naunepalizm – Voprosy filosofii, № 7, 1989. 125-p.
10. (2001) Ideja nacional'noj nezavisimosti: osnovnye ponjatija i principy.-T.:Uzbekiston, 2001. -80p.

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SECTION 30. Philosophy.

MORAL CULTURE OF THE PERSON AS A FACTOR OF SUSTAINABLE DEVELOPMENT OF SOCIETY

Abstract: *In given article some aspects and question of forming and changing of the moral culture of the person as a factor of sustainable development of society are considered.*

Key words: *Moral culture, person, values, globalization, sustainable development, individual, environment, society.*

Language: *English*

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Culture has historically emerged as a way of spiritual understanding of reality. Wilhelm Windelband defines it "as the totality of all that the human mind, by virtue of its inherent reasonableness, he generates from this material" [1, 62]. The main function of culture - to maintain and reproduce the combined spiritual experience of mankind, transfer it from generation to generation and enrich it. Every culture realizes its functions in relation to the whole human world, is a complex system, and operates at all levels. It is characterized primarily the ability to produce, store and transmit cultural values of various shapes and types.

Values are one of the main substantive components of culture. They predetermine vital reference person and thus his life is filled with a certain content, that is, form a system of systems, beliefs, preferences, which finds its expression in appropriate behavior in nature. Man is the creator of values and at the same time their godfather. From which it follows that, learning values, the person gets their own personal qualities. You could say that culture is supported by institutions of society and the state, forms the personality with the help of a system of values. In addition, it has caused and natural transformations. Acting on nature and transforming it "by itself", humanity forms a new branch of evolution that goes beyond natural reality and finds itself in the world of artifacts - the world's culture and society.

Today we see that culture is more complex and deep relationship mediates in the system of human-nature-society, so that increases the degree of alienation of man from nature. Continuing to build imply a supernatural reality, a person breaks away from the roots of his natural life, originally deterministic its existence. In XX century, this alienation has reached its maximum and was manifested in the development of industrial civilization, the further development of which led to the irreversible changes not only in the subject of the human environment, but also in the biosphere. There were essentially new forms of work organization, types of communication, methods of storage and transmission of information, communication in human societies. History has acquired features of globality, when all that is happening in the lives of individual people, affects the whole of humanity.

For industrial civilization is characterized by the constant generation of new ideas and concepts, but the idea of the conquest of nature, unfortunately, an alternative and was not found, although it is clear that human activity, contributing to negative changes in the dynamics of the biosphere, becomes the cause of its destruction.

Alvin Toffler in "The Third Wave" observes that "the loss of major grants, the defective functioning of the main supporting society life-support systems, role structure collapse is the crisis in the initial and most fragile structures - the human person" [2, 15]. The rate of change in the field of

technological development and the conditions of human existence is growing rapidly. Everything changes - political realities, the level of technological development, the economic situation, the spiritual climate. The problem is that technological progress is beginning to outpace its humanitarian understanding, creating anthropological crisis.

Among the main objective contradictions technological civilization refers lack of harmony in the system "-Nature man-society", as intense, but ill-considered human activity has led our civilization to ecological problems, catastrophic changes of the environment and the planet's climate, insoluble in the present structure of society. You could say that humanity is faced with a serious environmental crisis as a part of systemic shocks experienced by modern civilization. Obviously, the planetary civilization will ever make another ascent that has repeatedly provided to overcome the crisis caused by the "advent" of man on nature, or - to undergo destruction. Grounds for optimism in this situation lie in the possibilities of culture-personality.

A. Toffler argues that "in the midst of destruction and decay, we can find right now the stunning evidence of the birth and life. In the presence of intelligence and vision of a small incipient civilization may become more healthy, sensible, stable; more decent and more democratic than any known to us so far, "[2, 23]. There is no doubt that the conditions for a new ideological orientation has become apparent: they are enclosed in the deep processes of human culture and focus on the development of a new matrix values. The formation of new ideological orientations entails not only a different attitude to nature and man, but also a completely different way of life.

Understanding the realities of the emerging culture as a complex self-organizing system is necessary for each member of the society. Spiritual values and knowledge of the person who lives in harmony with the environment, should be the basis of individual and national wealth, and the absolute moral principles to ensure sustainable and safe in all respects, the existence and development of the "man-society-nature" of the system. Further development depends entirely on the education of the new man, the hallmark of which will be a new quality of thinking - holistic thinking, which is precisely defines environmental awareness.

V.I.Vernadsky in one of his last works pointed out that human power is not connected with "his mother, but with his brain, his mind and his direction this intelligence work." Further, he stressed that "before a man opens a great future if he will understand it and will not use their intelligence and their work on self-destruction" [3, 182].

In the twentieth century the environment as a set of principles of interaction between the biosphere of the Earth Sciences and the artificial environment created by human beings (but gotten out of control, and developing their own laws), is gradually becoming one of the most important trends of thought. This means that culture elects its object relationship to nature, so that it appeared a new direction - ecological culture. Its mission - to harmonize relations in the system "-Nature-man society," to bring knowledge of these relations in the cultural matrix.

The new attitude to form the individual assumes the maximum democratization of education and the education system. An example of the new attitude to life can be called a work of A. Schweitzer. She was associated with the development of new principles of ethics, which has at its core the principle of reverence for life in all its natural qualities - biological, zoological, anthropological. Schweitzer believed that it is impossible to distinguish between higher and lower life of biological forms, it is impossible to determine which of the forms of life more valuable. He put forward the thesis: "I am life that wants to live among life that wants to live" [4, 97], and hence it concluded that the criterion is the level of development of the culture of humanism made public.

For M. Heidegger as the essence of culture it is that "reverence for life, takes hold of our will to live, increasingly penetrates the consciousness of individuals and of all humanity. Culture is, therefore, not a phenomenon of the evolution of the world, but the act of the experience of our will to live, act, which is impossible, and there is no need to communicate with the world process, the known contact from the outside "[5, 151].

The recognition of the individual's role in harmonization of relations in the system "man - nature-society" - this is the thread that connects all the happening trend. Many philosophers see in this new approach to solving the problem of exit from the crisis. The priority for the company to become highly moral education of the individual, which in all conditions maintains his true humanity and the building of the new culture, humanistic ideals. The interdependence of nature and society at the present stage determines the need to address all social phenomena in relation to the natural environment in terms of positive or negative impact on them. In this sense, ecological culture serves as the norm and ideal, which places restrictions on ecologically sound ways of human selfishness, as well as the highest level of the complex characteristics of the human person.

References:

1. Vindel'band V (1995) Filosofija kul'tury i transcendental'nyj idealizm. – Moscow.
2. Toffler J (2002) Tret'ja volna. – Moscow.
3. Vernadskij VI (1989) Zhivoe veshhestvo. Biosfera. Chelovek // Nachalo i vechnost' zhizni - Moscow, 1989.
4. Shvejcer A (1991) Blagogovenie pered zhizn'ju. - Moscow, 1991.
5. Xajdeggsr M (1991) Razgovor na proselochnoj doroge. - Moscow, 1991.
6. Zajkovskaja TV (2016) Kul'tura lichnosti kak osnovnoj faktor garmonizacii otnoshenij v sisteme «chelovek-priroda-obshhestvo» Available: http://knigi.link/sovremennogo-obrazovatelnogo-metodologiya/kultura-lichnosti-kak-osnovnoy-faktor-25158.html (Accessed: 10.06.2016).
7. Karimov IA (2008) Juksak manavijat – engilmas kuch. Toshkent, Manavijat, 2008
8. (1997) Pedagogika / V.A.Slastenin, I.F.Isaev, A.I.Mishhenko, E.N.Shijanov. – M.: Shkola-Press, 1997. – 512 p.
9. Bibler VS (1990) Nravstvennost'. Kul'tura. Sovremennost': (Filosofskie razdum'ja o zhiznennyh problemah) / Redkol.: A. A. Gusejnov i dr // Jeticheskaja mysl': Nauch.-public. chtenija. - Moscow, 1990. - pp. 18.
10. Brjuhova NG (2014) Nravstvennaja kul'tura lichnosti // Zh. Kul'tura. Duhovnost'. Obshhestvo. - №9 – 2014. – pp. 150-155.

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SECTION 30. Philosophy.

SYNERGETIC APPROACH TO THE FORMING OF GEOECONOMIC THINKING

Abstract: *In given article some aspects of the synergetic approach to the forming of geoeconomic thinking and also the main aspects of the economic synergetics are considered.*

Key words: *Economy, economic thinking, geo-economic thinking, synergy, economic synergetics, nonlinear thinking, order and chaos, nonequilibrium systems.*

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Increasing the degree of transparency and the complexity of modern social and economic systems, the growth of uncertainty and non-linearity in their functioning, forcing economists refer to the methodology of scientific analysis, formed the other sciences, including natural. Significant methodological possibilities open to economic science in connection with the formation of synergy - the theory of self-organization of complex open non-linear systems of any nature.

The object of analysis is a cooperative synergy coherent interaction of a plurality of subsystems, which macroscopically appears as a self-organization. At the present time, in line with the synergy of research are specialists in different fields and sectors of science. In recent years, it formed a new direction in economic studies - economic synergy. Economic synergetics represents a new direction in economic analysis, which is not canceling the importance of traditional concepts, it shifts the center of gravity on such phenomena as the nonequilibrium, and nonlinearity in the development of economic systems, examines the processes of self-organization in precarious socio-economic environment.

The objective basis for the formation of an economic synergy as a science is the synergies of the economy as an open, complex, non-linear self-organizing system. In this case the synergistic knowledge not only forms a new science - economic synergies, but also creates a new methodology for the economic analysis.

Synergetic approach in economic-theoretical research serves as a method to study the socio-economic dynamics. This synergistic relationship of economics and economic synergy quite clearly displayed object dialectic and the method of science. Learning Economic synergetics object - a complex nonlinear nonequilibrium economic system (synergetic economics), is transformed into a set of techniques and methods for the preparation of new knowledge - in a non-linear method of analysis (method of economic synergetics). From the standpoint of economic synergy as a method of study of self-organizing economic systems, bifurcation, attractor, fluctuations probabilistic characteristics serve as analytical tools, research new socio-economic reality, already established in the economically developed countries of the world.

Economic synergetics as an economic method of analysis requires a systematic analysis of the nature of all categories of economy, the overall priority of the subject-object symmetry in the construction of all spheres of modern sophisticated market, combining the mechanisms of the economy and the mechanisms of social consciousness. Economic synergy also includes in its analysis of the processes of globalization, inter-civilizational convergence, the formation of mass public consciousness, that is the whole complex system of global market macroeconomics. The new science combines economic and institutional, economic and political, historical and cultural, national and global. According to many researchers, the emergence of the

methodology of synergetic marks the beginning of a new scientific revolution, because it was not just introducing a new system of concepts, but it changes the strategy of scientific knowledge contributes to the development of a fundamentally new scientific picture of the world and lead to a new interpretation of many of the fundamental principles of natural science [4, 255-256]. Synergetics becomes "a new meta-approach modern knowledge" [5, 62]. Many researchers believe that Synergetics as a new cognitive paradigm is close to the notion of "cognitive model" that serves as a way of ordering and interpretation of a particular material, the method is common for scientists of different specialties.

The methodological significance of the economic synergy is also in the fact that it is based on is the establishment of a fundamentally new, non-linear method of scientific thinking, its shape and style. According to Igor Dobronravov, if we consider the methodological consciousness of the unity of method and style, and "style seen as a way immersion method in a specific material, then an extension method to the methodological consciousness means the formation of the corresponding style of thinking" [6, 126]. Thinking Style acts as a way of applying the method, as the method of immersion in a particular material.

Style of thinking also implies the awareness of new scientific truths and their use in scientific research. Formation style of thinking in a certain sense, the methodological efforts synthesizes a certain historical period in the field of science.

Economic synergy contributes to rethinking the principles of knowledge, based on the postulates of classical economics, the linear deterministic thinking style. We can distinguish the following basic features are still the dominant line of thinking, the modern economic analysis:

- Understanding of the processes of economic development only as a linear, progressive and uncontested. If the alternative is, they are only occasional deviations from the main flow, are subordinated to this trend, determined by objective laws of the universe;

- Related to the economic equilibrium and economic order as the only possible and the most effective form of existence of the economic system;

- Attitude to non-uniformity and instability in economic development as a nuisance that must be overcome as something negative and shoot down the correct path;

- Understanding of chaos and chance as by factors that are not critical, ignoring the stochastic economic phenomena and processes as insignificant and minor;

- Rigid determinism, the study of economic phenomena as the causal chains through which the course of development can be figured out indefinitely into the past and the future. This is determined by the past and the future - the present and the past;

- The study of mechanisms of development of economic systems under the influence of predominantly external to them parameters;

- Cutting off the subject of the knowledge of its value orientations, lack of understanding of the role of social and psychological factors in the development of economic systems, ignoring such methods of economic knowledge as intuition, imagination, creativity;

- Inadequate or simplified representation of the object of research, consideration of the economic system as the sum of economic units of its components.

In general, linear thinking is typical psychological tendency to think linear circuits, circuits directly, without deviations and stops, climbing from the lowest to the highest.

Under the influence of synergy generated non-linear style that reflects the scientific knowledge on the defining features of thinking, post-nonclassical stage of development of science (see also our work -. [3]).

The term "non-linear thinking" was originally introduced in the scientific analysis of the representatives of the natural sciences in order to emphasize the instability and ambiguity of a situation of choice, its irreversibility and spontaneous process of formation of new structures. As they say Prigogine and I. Stengers, "our vision of nature is undergoing a radical change in the direction of multiplicity, complexity and temporality" [3, 41]. If the linear thinking is focused on the universality of action reversible dynamical laws, the mastery of a non-linear way of thinking implies the awareness of the existence of new scientific picture of the world, new methodological principles of analysis of nonlinear self-organizing systems, new standards of seeing the world and a scientific explanation of new facts, recorded by scientific analysis.

Nonlinear thinking is fundamentally at odds with the idea of universal laws, the stability of cash and social orders. Under his influence the disintegration stage-linear models of social development, to develop new approaches to it as a principle of openness, variability and alternative processes necessary to assume a "choice". The non-linear way of thinking associated with the formation of a new vision of the world as a complex evolving whole, naturally including a man and his activities. The non-linear way of thinking expressed these methodological principles, as the principle of symmetry breaking and random principle, as a necessary complement.

Thus, the economic synergy is formed as a new methodology of knowledge of self-organizing mechanisms of functioning of the socio-economic systems. Its development entails a radical

transformation of the methodological bases and the style of scientific economic thinking.

The main feature of the synergistic approach to socio-economic system is that it is always focused on the analysis of the dynamic interaction of economic agents, to find domestic sources of growth, to identify cooperative opportunities and solutions to obtain positive synergies. Economic synergy in terms of methodology, enriches economic theory such important principles as:

- Self-organization as a result of a certain ratio of order and chaos, equilibrium and non-equilibrium, stability and instability in the development of complex open nonlinear socio - economic systems;
- Bifurcation (multivariate) ways of further development of economic systems of self-organizational understanding of their future as a set of alternative paths rather than a single, predetermined in advance;
- Ambiguity and volatility of the situation of choice, its irreversibility and spontaneous process of formation of new structures;
- Nonlinear interaction and self-organization in the management of synergistic social and economic systems, the importance of small but precise resonance effects on the system, which is on an unstable stage of its development;
- An accident as an independent factor, which performs a constructive role in the bifurcation points;
- Defining the role of the subjective factor in the development of synergistic social and economic systems, synchronization mechanisms of mass public consciousness and the development of the economy;
- Active interaction of economic and social, economic and political, historical and cultural, national and global development in synergistic social and economic systems.

Thus, to the peculiarities of the economic synergy as the theory and methodology of modern economic research, include the following. Firstly, the economic synergy, as an area of economic theory focuses on nonlinear phenomena in economic evolution, describes nonequilibrium processes in the economy and shows the possible outcomes. Second, an important object of analysis is the study of the economic synergy mechanisms of new structures in the economic systems far from equilibrium, on the basis of coherent cooperative interactions. In this case the economic synergy reveals the internal causes of self-structuring of economic objects. Third, from the standpoint of economic synergy economy - it is not just a set of different micro Units, and a complex network of macroeconomic interactions that occur in the course of inter-firm, cross-sectoral and institutional linkages. Fourth, the economic synergy, creating a new concept of chaos, offers analytical tools for the study of deterministic chaos economies, opening thus a new direction in the theory of economic dynamics.

Fifthly, economic synergy sets new ways of posing problems, and offers a non-linear model to solve them. In this regard, the economic synergy is of particular importance for the theoretical economy, increasing its theoretical rather than descriptive. Sixth, with the advent of the economic paradigm of synergy is possible to dialogue between the natural and economic sciences and their interdisciplinary synthesis.

At the same time, the economic synergy is in a deep relationship with the most important areas of economic and theoretical knowledge. In a sense it can be considered as the most important area of the theory of economic dynamics which includes the theory of business cycles, and the theory of economic growth and many others.

Of particular importance is the economic synergy that this theory can explain the new dynamic economic processes that can not be explained by traditional theories and methods.

Economic synergy sources of cyclic economy development see the special complexity, nonlinearity, instability and disequilibrium of modern socio-economic systems. Economic synergetics offers new analytical methods for the study of not only exogenous but endogenous chaos socio-economic systems. It shows. What is the basis of cyclical development is strongly influenced by stochastic factors and processes. From the standpoint of economic synergy, if the system is unstable, even the smallest fluctuations can cause significant changes in the behavior of a dynamic economic system.

References:

1. Zang VB (1999) Sinergeticheskaja jekonomika. Vremja i peremeny v nelinejnoj jekonomicheskoj teorii: Per. s angl. – Moscow: Mir, 1999. – 335 p.
2. Shumpeter J (1982) Teorija jekonomicheskogo razvitija – Moscow: Progress, 1982. – 278 p.
3. Kapica SP, Kurdjumov SP, Malineckij GG (2001) Sinergetika i prognozy budushhego. – Moscow: Jeditorial URSS, 2001. – 283 p.
4. Reshetilo VP (2005) Institucional'naja intensifikacija i ee rol' v formirovanii samoorganizacionnyh mehanizmov

jekonomicheskogo razvitija / Vestnik Nacional'nogo tehnicheskogo universiteta "HPI". – Har'kov: NTU"HPI", 2005. – № 58. – pp. 9 – 13.

5. Reshetilo VP (2004) Rynochnyj potencial finansovyh institutov i sinergizm ego realizacii / Visnik Harkivs'kogo nacional'nogo universitetu im. V.N. Karazina. – Ekonomichna serija. –№ 630. – Harkiv, 2004. – pp. 28 – 33.
6. Reshetilo VP (2006) Jekonomicheskaja sinergetika institucional'nyh izmenenij. Monografija. – Har'kov: Prometej - Pres, 2006. – 288 p.
7. Valiev B (2008) Jekonomicheskaja kul'tura i faktory ee razvitija. - T.:Izdatel'sko-poligraficheskoe ob#edinenie ”Tashkentskij islamskij universitet”. 2008. - 37 p.
8. Mahmudov JR (2004) Mirovaja jekonomika: sovremennye jekonomicheskie sistemy. – T.: UMJeiD, 2004. – 528 p.
9. Ponomarev LN, et al. (1987) Jekonomicheskaja kul'tura: (sushhnost', napravlenija razvitija) - Moscow: Mysl', 1987.- 269 p.
10. Hajdarov HF (2010) Zakony reformirovanija. – Tashkent: Uzbekistan, 2010. – 160 p.

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