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This edition includes the articles recommended for publication by the organizing committee of Institution Scientific Practical Conference "Education and science in the XXI century".

In this edition the Researches of VSTU scientists on the following directions are presented: technology and production of threads, fabrics, knit and nonwoven fabrics; design and production of clothes; equipment of the clothing, textile and shoe industry; economics and management in clothing, textile and shoe industry.

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CONTROLLING EFFICIENCY ASSESSMENT AT AN ENTERPRISE

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Controlling as a management instrument is widespread in practice, however both in the theory, and in practice the insufficient attention is paid to questions of an assessment of its efficiency. Meanwhile, making the decision on implementing or enhancing of controlling, it is necessary to seize tools of its efficiency assessment.

Efficiency of controlling should be estimated by the performance of specialists to whom controlling functions are assigned at the enterprise. Number of such experts forms service of controlling whether it is a special department (e.g. controlling department) of the enterprise or specialists in controlling are the staff of different departments.

The assessment of overall performance of controlling service is based on three groups of criteria:
- criteria of overall performance of the organization which are estimated on the set target indicators and are reached thanks to activity of controlling service;
- the quantitative indicators allowing to estimate controller's work;
- performance of tasks of controlling service.

The first group of criteria is based on system of target indicators of the organization (production volume, sales proceeds, profit, profitability, labor productivity, etc.). Achievement of the objectives of the organization is a resultant factor of work of controlling service and testifies to degree of its efficiency. However, when using this group of criteria it is difficult to define a contribution to achievement of the enterprise objectives made by the controlling service, which is carrying out their coordination, as the achievement of the objectives is enabled by other departments as well.

The author [1] suggests using for an assessment of efficiency of the enterprise activity in the frame of controlling the following indicators: return on investment (ROI), return on total capital (ROC), return on equity (ROE), capital value.

The ROI indicator serves as the internal instrument of control and management of the invested capital, though it doesn't consider structure of the capital. Capital value characterizes efficiency of activity of the enterprise in the long-term period from different stakeholders' viewpoint. Use of these indicators in addition to traditional indicators of efficiency of economic activity (profit, profitability of production, profitability of sales) allows to estimate the effective management of the capital of the owner characterizing achievement of a main objective of business – increase of owner's welfare.

Use of quantitative indices of the controller's work gives the chance to estimate its contribution to achievement of the objectives and expenses of its work, supplementing an assessment of the first group of criteria. It is necessary to use both absolute and relative indicators in this group.

The absolute indicators characterizing value of controlling division work are the following:
  - the amount of requests processed for the period;
  - the amount of recommendations issued to managers for the period;
  - the amount of appeals of managers to information system for the period;
  - the amount of the decisions made according to the recommendation of controllers for the period, and their efficiency, etc.

The analysis of controlling division work on the basis of relative indicators can be carried out by means of the following criteria:
  - average amount of the requests processed by a controller;
  - average amount of requests for a manager;
  - average number of recommendations issued by a controller;
  - quota of decisions made taking into account recommendations of the controlling division, and their efficiency;
  - average time of request processing by the controlling division.

However, using of quantitative indicators only hides quality of controlling activity and focuses controllers on performance of big number of less laborious types of works. Thus the level of operational controlling increases (as the operational information is processed and transferred faster), causing the failure of the strategic controlling.

The system of an assessment of overall performance of controlling work is supplemented by indicators of the third group which give the chance to estimate performance of the tasks of controlling division (e.g. goal-setting mechanism implemented, compliance of structure of the organization to its objectives, timely ensuring all levels of the management of necessary information, high-quality monitoring of environment, compliance of tools of the analysis, account and decision-making to managers' requirements, increase of competitiveness of management system, etc). The assessment of performance of functions and tasks by the controlling division has to be carried out by top-managers at least once a year.

Combining of indicators of three groups allows to characterize controlling division activity comprehensively and to define the main directions of its further work. Besides, the complex system of an assessment of results of controlling makes clearer the essence, need and the main objectives of controlling for the staff of functional divisions, facilitating their cooperation with controllers.

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TO ANALYSIS OF DETAILS ON LONGEVITY AFTER CRITERION OF THE FATIGUE STRENGTH

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The increase of single production capacities of equipment results in the substantial increase of loadings in mechanisms, especially in an equipment with the traditional recreation of technological process. Therefore along from project self-reactance and functional descriptions of equipment there is also a growing requirement to the level of its longevity. The analysis of observations on productions certifies that determining for most details are signs of the fatigue destruction.

The purpose of work is to trace the narrow direct of analysis of longevity applicable to the details of complex forms, which do not fall under traditional complex decision.

The calculation of longevity is executed in the traditional (deterministic) or probabilistic staging. The first is based on retrospective information about longevity of operating equipment, the second – on statistical descriptions of strength of material and loading of details.

Comfortable on the stage of elaboration of requirement specification are calculations after the coefficient of reserve of longevity. This coefficient is set for every detail separately on the basis of experience of designer comparing of the expected values to the results of observation on production in exploitation. This estimation of longevity is convenient in practice, however, it doesn't characterize the level of reliability in an obvious kind. The change of any factor of influence compels to define more precisely a value the coefficient of supply and makes impossible its application as normative description. Sometimes it's recommended to use the method of the differentiated determination the coefficient of supply of longevity as product of a row of coefficients, each of which takes into account a separate factor and also sets in certain limits. Experience testifies that expected thus value a coefficient not justified, as resulting in the considerable varying.

The transferred failings are removed at application of method [1], where after equalization of the crooked fatigue of detail the value of the limited longevity in the cycles of loadings is obtained:

$$N = N_G \left(\frac{\sigma_{-1Д-}}{\sigma_{-1ДN}} \right)^m \cdot , \qquad (1)$$

where N_G − an abscissa of inflection point the crooked fatigue $\sigma_{-1ДN}$ − amplitude of stress in a detail at a symmetric cycle and number of cycles of loading N; m − a parameter of inclination of area of the crooked fatigue of detail. Limit of fatigue of detail of natural sizes is determined experimentally or analytically after a typical method for the details of general machine-building. For the calculation of limit of

fatigue of detail enter a coefficient, which takes into account influence on limit of fatigue of material of structural, technological and operating factors.

However much complication of forms of details and inconstancy of factors of influence results in considerable errors at determination $\sigma_{-1Д}$. Therefore this approach is expedient only in calculations during modernization of equipment with the use of versatile statistical information.

At planning of perspective models with heredity of construction after the set resource after the criterion of the fatigue strength positions of calculations [2] are offered, where dependence of equivalent stress $\sigma_{eкк_i}$ is used in a dangerous cut from the proper number of cycles of loading N_{pi} to destruction:

$$\sigma_{eкк1}^m N_{p1} = \sigma_{eкк2}^m N_{p2},$$ (2)

where m − a parameter, which takes into account inclination of working area of the crooked fatigue of detail, which is built from data of operating supervisions; indices i =1, 2 correspond to the parameters to and after planning. Usually such approach will be realized at presence of accumulated empiricists about the resource of details and analytic about their impact loading.

The determined calculations of the tired longevity are transferred giving general conclusions about faultlessness of object for a calculation resource without its quantitative estimation that behave to the calculations of reliability only conditionally. The calculated value of equivalent tension answers 50 % probability of destruction of detail. In calculations with the beforehand set probability it is recommended to enter a conditional coefficient $K_\sigma = 10^{U_p \sigma_{\lg N_p}}$, where $\sigma_{\lg N_p}$ is a standard deviation logarithm of middle longevity in the cycles of loading; U_p − a quintile of normal distribution.

While applying probabilistic calculations on longevity it is necessary to take into account inconstancy of parameters of strength of details and terms of their loading. The typical methods are little adjusted for the details of difficult forms.

The author offers calculation-experimental method [3] of determination of longevity after the curve of fatigue of detail, which was built as a result of power analysis and information about its resource to destruction. A calculation includes the followings actions: determination of the maximal loadings on a detail; calculation of equivalent stress in its dangerous cut and proper number of cycles of detail for the term of service to destruction from data of operating supervisions; construction of working part of branch of the crooked fatigue of detail, which characterizes limits of the limited fatigue of detail at the proper numbers of cycles of loading. Analytical expression of the shock loading was presented as polynomial, which was got numeral analytical by a method with the use of calculable experiment. The calculation of longevity was executed in the case of not banal description of casual values nonlinear equalization which does not submit classic normal distribution. The limited limit of fatigue of detail is determined for the numbers of cycles, which are responsible for longevity on a refuse by the linear hypothesis of addition of the fatigue destructions.

The curve of fatigue, which characterizes median longevity of details and expresses the number of cycles to destruction, was built after calculated these parameters for of the same type details which had different terms of loading. It is rationally to use a method foremost in the specified calculations for acceptance of final decisions at planning of mass production.

The resulted information served mathematical support at the choice of designer decisions at an improvement and project of automatic half-hose machine.

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OPTIMIZATION OF TEXTILE COMPOSITES FORMATION PROCESS

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Keywords: modeling, formation, textile composites, polymer composition, microwave and IR exposure, generalized desirability function, Derringer desirability function.

The aim of this work is modeling and optimization of the processes occurring during the formation of textile composite materials with impregnation method using modern methods of intensification of physical and chemical processes with using electromagnetic waves of microwave (MW) and infrared (IR) bands that reduce the energy consumption of basic processes and conducting of a comparative analysis of the effectiveness of high intensity methods of forming the textile composite material.

The experiments used the polymer composition (aqueous dispersion of styrene-acrylate) of the three concentrations: 100 g /L 200 g/L 300 g/L; radiation power was set at three levels: 300 W, 450 W, 600 W microwave and 1800 W 2200 W, 2600 W for IR.

Optimizing the process of formation of textile composite materials requires finding such process parameters, when multiple result indicators are optimal: energy

consumption, the height of capillary rise and the temperature of the polymer composition. To solve this optimization problem generalized desirability function is introduced, which takes into account the values of all of the resulting indicators [1]:

$$D = (d_1 \times d_2 \times ... \times d_k)^{1/k}, \tag{1}$$

where d_i — partial desirability functions ($i \in [1..k]$), k — number of partial desirability functions.

Partial desirability functions are determined by normalizing the resulting functions, so that the value ranged from 0 to 1, since the resulting indicators units may have different dimensions and ranges. In this case the value of 0 corresponds to the least, and 1 to the most desirable values of the functions [2, 3].

Derived partial desirability functions of temperature, height, and energy consumption were used to obtain generalized desirability functions in form of (1) for infrared and microwave intensification methods of impregnation process.

It is found that generalized desirability function for IR and microwave methods of intensification have the same nature and allow to determine the optimal exposure time for the selected radiation power and vice versa. After the study of desirability functions formulas for determining the optimal combination of power and time of exposure to various concentrations were obtained.

The studies have found that the intensification of the process of formation of textile composite materials using microwave radiation allows reaching a given height of polymer composition raising (efficiency of impregnation) with significantly less power and in significantly less time.

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OPTIMIZATION OF THE PROCESS OF WEAVING TECHNICAL FABRIC

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Currently, among the weavers of the Republic of Belarus, the highest position is occupied by the production of glass fiber and products on its basis, which today enjoy wide popularity. Range of application of the fiberglass is various: enterprise aviation

and space industry, military-industrial complex, automotive, shipbuilding, construction industry and other fields.

The aim of this work is the selection of optimal parameters for production of insulating glass to reduce its defects and improve quality. The fabric is produced of a width 127 cm pneumatic Jet-710 (Japan). In the warp we use yarns with a liner density of 71 Tex and weft – 136 Tex. The thickness of the fabric – 0,232 mm, the surface density fabric – 230 g/m^2, the density of the fabric in the warp – 170 threads/10 cm and in the weft – 83 threads/10 cm. Low yield of the variety of fabrics 1 class due to the high level of defects. It was 2,27 defect per 100 liner meters of fabric. The vices of the warp were 0,46, yarn weft – 1,4 and vices of a general nature – 0,41. Studies have shown, that the main cause of defects weaving ishigh humidity of weft yarn. Humidity of the weft yarn was 0,32 % versus 0,1 % in the norm.

To increase the intensity of the drying process of filling glass yarns, to reduce their moisture content, we proposed to reduce the weight of the yarn on the bobbin from 8 kg to 6 kg. Studies conducted in the production laboratory of factory showed, that the level of humidity weft thread to weaving decreased from 0,32 % (bobbin 8 kg) to 0,14 % (bobbin 6 kg). Table 1 shows the results of determining the moisture content of the weft yarn.

Table 1 − Results of determining the moisture content of the weft yarn

The number of tests	The weight of the weft yarn on the bobbin, g		
	8000	7000	6000
1	0,28	0,26	0,11
2	0,23	0,18	0,2
3	0,26	0,23	0,15
4	0,34	0,17	0,07
5	0,33	0,31	0,09
6	0,25	0,28	0,13
7	0,3	0,19	0,17
8	0,33	0,17	0,19
9	0,32	0,2	0,21
10	0,23	0,29	0,18
11	0,55	0,5	0,06
12	0,44	0,33	0,08
Average	0,32	0,24	0,14

Besides humidity of the weft thread, we also studied the effect of the speed of the main shaft of the weaving loom on defect fabric. Studies have been proposed for high-speed modes of 600 rev/min, 650 rev/min and 700 rev/min. For each option to turn out for 2 rolls of fabric length of 2000 m. These rolls were compiled further defective sheets. Analysis of these sheets showed, that the lowest level of the fabrics has defects, worked out at a rotational speed of the main shaft of the loom 650 rev/min and using weft yarn moisture of 0,14 %.

The proposed activities will allow to reduce the defect rate of fiberglass from 2,27 to 1,13 blemish on 100 meters of fabric.

The economic effect of the introduction of the proposed measures will be 800 million Rubles for the annual production of the weaving fabrics.

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ACCOUNTING PROFIT THEORY IN BELARUS: THE STATUS QUO

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There is no doubt that any system of accounting should be based on a concept or doctrine of accounting and financial reporting. This concept is the basis for the development of the methodology of accounting and financial statements. The conceptual framework is a holistic system of concepts that are derived from financial reporting purposes.

In addition, the concept typically defines the limits of financial statements, the composition and the types of transactions, and other events and circumstances to be presented in the financial statements. The concept also reveals the conditions for their recognition and registration and the procedure for their compilation in financial statements.

Thus, the concept establishes the regulations (concepts) that are the basis of the accounting and financial reporting of the organization in any country. Such a concept should provide a system of formal definitions of revenue, equity, income and expenses in relation to the subject of this study, and to determine the requirements for building a harmonious and coherent system of financial reporting. Examples of these concepts are the Framework for the Preparation and Presentation of Financial Statements (the Framework) IFRS and Statement of Financial Accounting Concepts - SFAC (USA).

In Belarus, such concept has not been developed so far. Accounting theory in Belarus is only a more or less consistent description of the technique of accounting, without any proof of the possible versions of the classification, evaluation, and methods of depreciation or write-off of assets and liabilities of the organization, not to mention the rationale for the composition, content, and presentation of financial statements.

In the absence of such a concept it is difficult and even impossible to build a complete system of accounting and financial reporting that reflects the model of the financial position of the organization on the reporting date. There is only one law on accounting and reporting in Belarus, that defines basic concepts of accounting and reporting. But that law does not reveal their (definitions) essence. But it is not enough. It is also insufficient only for the instructions of the Ministry of Finance of Belarus on various aspects of accounting, which do not contain clear logical connections between the terms of accounting and financial reporting, and do not clearly define the purpose of such reporting.

So, in the economic literature circulating in Belarus, the situation reflects several concepts of profit, having clearly non-Belarusian origins. But there are no finished concepts, such as Statement of Financial Accounting Concepts - SFAC (USA), described in all its detail in Belarus accounting literature.

There is no doubt that the absence of at least some concept of profit in the country is associated with the attitude towards profit on the part of the academic community and the Belarusian authorities. Thus, the main indicator of economic efficiency in Belarus is GDP growth, but not profit. This opinion has been expressed in the last ten years and was confirmed by the director of the Institute of Economics of National Academy of Science (Belarus), Academician Nikitenko at a recent scientific conference in Minsk on September 2012 (http://naviny.by/pda/material/?type=articles&id=133532). He made a proposal to Belarusian scientists to compile a "unique experience of the Belarusian economic model" to the level of a theory, which will then be used to train local economists.

According to Nikitenko, the result of such theoretical framework will update many economic concepts, and that is likely to change their traditional meanings. And then Nikitenko underlined, that our economic experience gives many of reason not to consider income as the primary indicator of economic performance because the Belarusian economy is showing miracles of efficiency that are not being profitable.

It was Koltunov, Deputy Chairman of the Standing Committee of the Parliament of Belarus on economic policy, who told the Belarusian public (October 2012), as, in the opinion of the Belarusian authorities, a real investor should look like (whom they will not take away the property). "This investor is not interested in buying the company to make a profit, and put money into the money-box. His goals are the development, and modernization of production," said Koltunov. (www.belaruspartisan.org/economic/222055/).

In Belarusian literature, the dominant thought up to the present time is the Marxist theory of profit as the legacy of the recent communist past. According to Marx's theory of exploitation, living labour at an adequate level of productiveness is able to create and keep more value than it costs the employer to acquire; which is exactly the economic motive why the employer buys it, i.e. to preserve and increase the value of the capital at his disposal. Thus, the surplus-labour is *unpaid* labour assumed by employers in the configuration of work-time and output goods, on the ground that employers own and equip the means of production (i.e. fixed assets) worked with. The economical function of labour is only to keep their (i.e. the means of production) value, add value to them, and transfer value.

Economic theory in Belarus does not give any formal definitions of the entity profit. It turns out, that profit is just a part of the net income of society (Strazhev, Bogdanovskaya, Migun, Vinogorov, Rusak, Shartuh (2005, p.114), etc.). And economic theory does not explain the need for such a profit for a particular investor (owner, founder, etc., etc.).

Accounting and business analysts consider only a mechanism for calculating the profit of the entity (i.e. from which amount you need to subtract the concrete sum, and what amount you need to add to this amount to get the amount of profit) (Kravchenko (2005, p.234) , Ladutko, Borisevsky, Drobyshevsky (2006, p.369). But what is the essence of the result of the mathematical calculations is not disclosed.

So, while analyzing all the existing profit definitions we constantly come up against either the formula for the calculation of profit in its various variants at the

entity level, or income at high levels such as the state or society in general, and with rare exception - at the level of the enterprise.

Thus, a particular feature of the theoretical propositions of company profits is their ideological and propaganda component: the profit is considered at the level of society as part of national income. The profit does not belong only to the owner, but to the rest of society, including staff and employees. So the first part of the profits distributed to the employees and staff, then some of it goes to the owner on a residual basis (the basic practical principle of communism is everything away and divide). In this case, the authors do not explain the relationship between the capital and the profit of organization.

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INNOVATIONS IN BELARUS: THE STATUS QUO

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In this paper some factors that characterize innovation in Belarus are discussed as well as how these factors could be addressed to encourage innovation.

According to Freudenberg (2003, p. 14) "innovation can be defined as the development, deployment and economic utilization of new products, processes and services, and is an increasingly important contributor to sustained and sustainable economic growth, both at micro-economic and macro-economic levels".

In Belarus, innovation is preferentially done by introducing incrementally-innovative products, which are new to the enterprise but not to the industry sector and especially to the outer world. Since risk is especially consequential in resource-poor settings, this approach enables the entity to manage risk by building on the innovations of others. The lower-risk approach, while less likely to cause a large loss of money, also holds fewer rewards and is a compromise approach to genuine entrepreneurship. Furthermore, at some point, novel innovation is inevitable if progress is to be made.

In the early and late 1990s small enterprises were considered as a driving force for job creation, growth and global competitiveness through innovation (Feldman et al, 2002).

It has been found that large enterprises have a greater propensity to patent than small enterprises. Furthermore, small enterprises appear to be as innovative as large firms and large and small firm innovative activities appear to be complementary (Feldman et al, 2002).

Both small and large enterprises in Belarus have advantages and disadvantages in creating innovation. On the one hand, small enterprises are more responsive to consumer needs and environmental changes and also can communicate this information more rapidly internally. They also have a flatter management structure, which facilitates dialogue between employees (i.e. workers) and CEO. As for me this is quite a controversial statement that large enterprises in Belarus have more developments in infrastructure, in research and development (R&D), marketing, and finance. The only thing that is undeniable is the fact that large enterprises have considerably more financial (in some cases) and human resources. Moreover, their large scale and full support from the government (including financial support) provides them a higher capacity to manufacture and distribute products, but in most cases they are not innovative. So far it is observed that large-scale enterprises don't introduce the bulk of innovation in Belarus. The result is that innovations are not as sensitive to local needs. Moreover, little legislation has been enacted to support small business.

Although many small firms will not undertake R&D they will still be innovative and these firms will depend on knowledge spillovers from external sources including universities (Audretsch and Feldman, 1996a&b; Link and Rees, 1990). In fact, small firms when compared with large firms will be better at absorbing knowledge from external sources (Feldman et al, 2002). Here new employees will be important and small firms will be able to exploit knowledge embodied in employees to a greater degree than large firms (Audretsch and Stephan, 1996). The reason for this is that small firms will provide an environment for their workers to develop ideas not apparent in large firms (Prevezer, 1997).

In Belarus, the main official reason for conducting innovation surveys is to inform public policy making and the design of business strategies. The majority of innovation studies in Belarus focus on the problems and perspectives of generation, diffusion, appropriation and use of new knowledge in businesses in order to show the innovation efficiency of the officially declared model of economic development. It is very sad as less priority is given to cross-country comparisons and benchmarking. But in comparison with developed countries Belarus has no innovation in the terminology and indicators of these countries. Hence, the goal of all innovations research is to develop the home Belarusian indicators to assess innovation processes. But at the level of the small and medium-sized enterprise (SME), or the individual project, management practices such as scoreboarding or benchmarking have been established in economically developed countries (for industrial innovation patent scoreboards and R&D scoreboards are published) (Grupp, 2006). In my opinion, innovation measurement exercises should focus on the innovation process rather than its outputs and emphasize how capabilities, efforts and results are dealt with.

A particular subject of interest in Belarus is the "potentially innovative firm". Innovation-active firms are those that "have had innovation activities during the

period under review, including those with ongoing and abandoned activities" (Oslo manual, 3rd edition, 2005). Potentially innovative firms are a subset of these, those that have made innovation efforts (i.e. conducted innovation activities) but have not achieved results (innovations) during the period of analysis. Inside this group businesses might be found that have innovated in the past, or businesses that may innovate in the near future. Nevertheless, considering that products and processes become obsolete rapidly, the existence of a large number of potentially innovative enterprises may suggest strong barriers to innovation, or premature attempts to innovate in the absence of the necessary resources. A key element in innovation policies in Belarus must be to assist potentially innovative firms to overcome the obstacles that prevent them from being innovative and to convert their efforts into innovations.

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JURISTIC FOUNDATIONS OF THE ACCOUNTING PROFIT THEORY

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The main purpose of the existence of any business entity is making a profit and the distribution of profits among the parties (owners) (Article 46 of the Civil Code of

Belarus). The enterprise is the property complex used for business purposes as an object of rights under Article 132 of the Civil Code of Belarus. A corporation may be organized for the purpose of making a profit, or it may be not-for profit (Jerry J. Weygandt, Paul D. Kimmel, Donald E. Kieso, 2012, p.538).

The enterprise as a property complex includes all types of property intended for its activities, including land, buildings, equipment, inventory, raw materials, products, claims, liabilities, and rights in signs, personalized company, its products, work and services (trade name, trademarks, service marks), and other exclusive rights (article 132 of the Civil Code of Belarus).

Thus, the commercial organization is a proprietary system designed to earn profits. But such a property complex, above all, has the property of legal isolation. Under Article 44 of the Civil Code of Belarus, a legal entity is an organization that has some assets in the property, economic or operational management. In the USA the corporation is an entity separate and distinct from its owners (Jerry J. Weygandt, Paul D. Kimmel, Donald E. Kieso, 2012, p.538).

So, the property of a legal entity is owned by a legal entity under Property Act (right of property, the right of business, etc.). Consequently, except for unitary and other legal forms of enterprises, the owner has only contractual rights to the property company. Namely, s/he has the right to demand and receive dividends and the right to claim the property in cases established by law. For example, it is case of liquidation or exit from the party's founding organization such as LLC, SLC.

The ownership of the property that was transferred to the equity of the new organization does not belong to the owner. The owner turns to one of the creditors of a new organization after s/he transfers the assets to equity. In addition, other lenders e.g. the state for taxes, the staff in terms of wages, suppliers and contractors have the right to demand the assets of the company.

Thus, from a legal point of view, any company is a balance of assets and property rights to the assets.

Because of such balance, from a financial point of view, any enterprise is a pyramid scheme. The company exists only during the period of time when it has enough assets to pay debts, and because not all creditors are placing their rights to the company's property at the same time.

There is no doubt that lenders' enterprises differ regarding the specifics of the claim. Thus, creditors, suppliers are protected to ensure timely receipt of the assets of the enterprise to pay off existing obligations. Creditor-owners are more interested in not getting attached assets back.

More precisely, the owners are interested in dividends. So, the owners contribute the property-investment in the organization. And instead they get a new type of asset. This type of asset is the operations of obligation and other rights related to the receipt of income in the form of dividends. Incomes (profits) are due to the increment value of such property and, therefore, to the increase of the amount of debt before owners receive anything from their own businesses.

Such rights are issued shares or constituent documents of the organization.

Increasing the amount of debt for the owners for the period (what we previously called capital) and is defined as income (profit).

The owner is interested in increasing the enterprise debt value to him/her and the return of some amounts of debt in the form of dividends (the transferred property does not belong to him/her.) Thus, when creating a company, the owner gets a mechanism to increase the value of the assets of the enterprise, which increases the right to claim the property.

Investments that bring new value in the form of income (profit) to organizations, as embodied in the latter, represent the capital for the owner.

The capital for the owner is the amount of property claims (rights) on assets of the company. In corporations, such rights are issued in the form of shares.

Profit is the increment value of property rights of the founders of the entity during the reporting period. The profit is not the money; it is the property owner's rights.

Net assets of the organization are a total value of the property rights of the participants in the organization under its liquidation, or total liabilities of the organization in liquidation.

Retained profit is the incremental cost of the property rights of the parties during the reporting period, subject to the satisfaction of the dividend under the law of the founding documents of the organization. On the other hand, retained earnings are the increment of the organization commitment to be paid in the form of dividends in accordance with the laws and the founding documents of the organization. For example, in the form of the payment of dividends is based on the decision of the participants meeting.

The loss is the sum that reduces the property rights of the parties that will be returned to them in accordance with applicable law and the constituent documents for liquidation of the organization.

Losses for the period indicate that the owner has not only earned nothing on invested capital, but also the owner is in debt to creditors of the corporation. (In the best case for his/her money kept staff of corporation).

I agree that only assets of the organization can be earmarked for any purpose, namely: money, materials, fixed assets, etc. But how can you earmark for any purposes for the specific debts of the organization? How can the entity, for example, spend the accounts payable to suppliers and contractors if they are not money for buying something? Undoubtedly, this is nonsense. After all, only assets the organization in the amount of debt the founder can be directed to pay the debt of the entity.

Therefore the source of new assets of the organization is its existing assets. That is, the organization changes money for goods, and goods for money. The debt owners exchange on the new assets is nonsense. You can only exchange the amount of assets in the amount of the net profit to the new property, not the profit itself. The profit cannot be the source of the property, because it is not an asset.

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SOME INDICATORS OF SMALL FIRM INNOVATION ACTIVITIES

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This paper presents an approach that can be used to provide rigorous analysis of small firm innovation activity for comparison with other regions and countries. It is clear that complex and qualitative interrelations within an innovative Belarus national environment cannot be measured in a simple sense (Schumpeter, 1934). So, it is therefore necessary to combine several indicators for innovation to form an aggregate measure (Grupp, 2006). In order to reach a broader audience it is necessary to develop simple measures and this is well established. A more complete compilation of such simple indicators has been undertaken by Freudenberg (2003). This report identifies those indicators of innovation performance that are relevant to small firm policy which enables comparison of innovation activity between regions/countries.

In order to develop innovation performance indicators of relevance to small firms there are two principal stages. The first stage is developing a framework for selecting and placing indicators in three performance areas according to i) basic research and the production of new knowledge, ii) links between public and private research and iii) levels of industrial innovation (OECD, 2001). The second stage concerning the selection of variables and indicators involves investigation of the three performance areas outlined in stage 1. The core components include the generation of new knowledge (involving variables such as business researchers in the labour force), industry-science linkages (patents and publications), and industrial innovation (business researchers in the labour force, patents and new products and processes) (Freudenberg, 2003).

On our opinion the analysis of the innovation activities of enterprise must base on the following:

1. The analysis is performed on the basis of the specified indicators rating.

2. The analysis is carried out by groups of enterprise belonging to the same type of business activities (sector, segment) and the same size (in our case - small enterprise).

3. The variables are derived from Internet free databases of small firms.

In our opinion the following indicators can be determined to measure innovation performance of a concrete firm:

Ratio of sales of new products to total sales;

Research departments available;

Publications in most industry-relevant scientific disciplines;

Patents or patent applications.

Table 1 shows an example of the analysis of small firms innovation activities in comparison with other regions and countries - two companies from Vitebsk (Belarus), i.e. Solo entity "Polymerconstruction" (website - http://www.polymercon.ru/) and JV LLC "Fortex-Water Technologies" (Website http: // www. fortex.by/), and a company from the United States (State of Michigan) - Corporation "Pure water works, Inc." (Website http://www.purewaterworks.biz/).

Table 1 − Comparative analysis of innovation activities of several small firms

Innovation Performance Indicator	Solo entity "Polymerconstruction"»		JV LLC "Fortex-Water Technologies"		Corporation "Pure water works, Inc."		Notes
	value of the indicator	rating (position)	value of the indicator	rating (position)	value of the indicator	rating (position)	
Ratio of sales of new products to total sales	0	0	0	0	0	0	No data on the network
Research departments available	True	1	False	2	False	2	
Publications in most industry-relevant scientific disciplines	7	1	0	3	5	2	
Patents or patent applications.	2	1	0	2	0	2	
Total, points		3		7		6	

Source: *work of the author*

Thus, a more innovative is the activity of the Solo entity "Polymerconstruction".

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UDC 658

ETYMOLOGICAL ANALYSIS TO DETERMINE THE ESSENCE OF THE CONCEPT "SUSTAINABLE DEVELOPMENT"

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The National Strategy of Sustainable Development for the period by 2020 (NSSD-2020) was developed in the Republic of Belarus according to the Law "On State Forecasting and Programs of Social and Economic Development of the Republic of Belarus."

The Republic of Belarus was the first country among the CIS members to develop NSSD by the year of 2010, which was approved by the Government in 1997 and highly appraised at the UN Regional Conference on Sustainable Development of Countries with economies in transition held in Minsk in April, 1997. The Strategy appeared to be an important methodological and ideological document for development and implementation of state forecasts and programs which enabled to make reliable conditions for the country's transition to sustainable development.

Issues of sustainable development and regulation of its processes are in the scope of consistent consideration of scholars in the country and overseas. The essence of sustainable development as the concept and various interpretations of this issue are found in the works of T.A. Akimova, B.E. Bolshakova, V.P. Bransky, A.B. Weber, N.P.Vashchekin, E.V.Girusov, V.G.Gorshkov, V.I.Danilov-Danilyan, M.Ch. Zalikhanov, K.Y.Kondratyev, V.A. Koptyug, O.L.Kuznetsov, P.G. Kuznetsov, L. Laroush, V.K.Levashov, K.S.Losev, V.A.Los, N.N.Moiseev, M.A.Muntyan, Y. Odum, G.Odum, A.E.Petrov, A.D. Ursul, V.V. Haskin, A.N. Chumakov, D. Shlessar, A.S.Shcheulin, R.G.Yanovsky, F.T.Yanshinaet al.

So far, there is no a single opinion on the term "sustainable development". In Russian "sustainable" means 'устойчивый' (stable), or 'сбалансированный' (well-balanced), or 'равновесный' (equilibrium).

Despite general confidence in the lack of alternative for the model of sustainable development, there is a variety of interpretation of the term *sustainable development* as well as its essence, its issues and proposed models of its implementation in scientific papers. The table below shows variants of translation of the term *sustainable development* into some world languages:

World Languages	Official translation	Literal translation from a world language into Russian
French	Developpment durable	Долговременное развитие
Italian	Svilupposostenibile	Заслуживающее поддержки развитие
German	Nachhaltige Entwicklung	Продолжительное развитие
Swedish	Enstadigutveckling	Устойчивое развитие
Norwegian	Enholdbarutvickling	Прочное развитие
Japanese	Jizoki-tekinakaihatsu	Продолжительное развитие

Compiled by the author

Recently a wide range of interpretation of the concept 'sustainable development' has been proposed (researchers say about 100 competitive options of definition of the term *sustainable development*) which specify its initial variant.Typically these definitions differ only by the focus on certain issues, the key elements of the definition suggested by the G. H. Brundtland Commission being the same (equal distribution of the world resources for living generation and future ones without usage over the ecosystem's capacity).

The table below presents some of the proposed definitions of *sustainable development*:

Author	Definition
IUCN, UNEP, WWF, 1991	**Sustainable development** is improvement of the quality of human life while living within the carrying capacity of supporting eco-systems
TheUN, Human Development Report, 1994 .	**Sustainable development** is development that not only generates economic growth but distributes its benefits equitably; that regenerates the environment rather than destroying it; that empowers people rather than marginalizing them.
Russian Federation Presidential Edict № 440, 01.04.1996 .	**Sustainable development** is a stable socioeconomic development, which does not destroy its natural basis.
Secretary-General of the UN, 1999.	**Sustainable development as a wholeis** a steady growth of useful energy.
WCED, G. H. Brundtland	**Sustainable development i**s a process in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potentials to meet human needs and aspirations.
S.I. Ozhegov's Dictionary	The term *sustainable development* is defined as a fluctuation resistant, steady process of transition from one state of being to another, more advanced one, from old quantitative state of being to a new one, from simple to a complex one, from lower to the highest one.
O.S. Shimova	**Sustainable development** is development which meets the needs of the present without compromising the ability of future generations to meet their own needs.
A.D. Ursul, A.L. Romanovich	**Sustainable development** is manageable, well-balanced social development which doesn't destroy natural basis and ensures continuous civilizational progress. The new strategy of development gradually combines economic, environmental, and social activities into a single self-organized system.
M.G. Kireenko	**Sustainable development -** is development that is capable of providing a balanced solution of socio-economic challenges of preservation of favorable environment, natural resource potential in order to meet the needs of present and future generations.
V.N. Shimov, A.V. Bogdanovich, S.P. Tkachov	**Sustainable development -** is global strategy, and it can not be successfully implemented in a particular country, and the world at large.
ECI Council (San José, Costa Rica)	**Sustainability** is a simple concept: live reasonably within the bounds of environmental capacity.

Compiled by the author

The term *sustainable development* is conceptualized by various social groups with politicians, philosophers, economists, lawyers, ecologists, sociologists, biologists, physicists, etc. discussing it. Each of their definitions reflects views of various social groups such as scientific, business, political, etc. Each science (economics, sociology, environmental science, philosophy, etc.) looks at the problem of sustainable development through the lens of its indicators and concepts.

Thus, we consider *sustainable development* to be a complex and complicated category of the contemporary science.

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TASKS OF STRATEGIC MANAGEMENT OF LIGHT INDUSTRY ENTERPRISES UNDER CRISIS CONDITIONS

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Strategic approach to enterprise management is caused basically by instability, dynamic nature of environmental conditions and aggressive competition. Keen interest to strategic management can be explained by its direct relation to the enterprise competitiveness level and desire of the administration to timely respond to ever changing environmental conditions. Strategic management is a continuous process.

The main tasks of the strategic management are as follows:

Determination of the type of commercial activity and formation of strategic trends of its development, i.e. definition of objectives and long-term prospects of development.

Transformation of general objectives into concrete directions of activity.

Skilful implementation of the selected plan until achievement of a desired result.

Effective implementation of the selected strategy.

Assessment of the work done, analysis of the market situation, introduction of corrections into basic long-term directions of activity.

Objectives and strategy into ways of implementation of the latter on the basis of accumulated experience, changed conditions, new ideas or possibilities.

Development of the company proper, determination of objectives, formation of strategy, realization of strategic plan jointly with activity analysis constitute the essence of strategic management.

Each of five strategic management tasks should be constantly monitored and decision should be taken as to continuation of the work in the selected direction or introduction of some corrections or alterations. The worked-out strategy is subject to changes in the strategic management process depending on variations of environmental conditions or appearance of new possibilities capable to improve the

strategy. That is why the strategy working-out is a process but not an action performed once and for all times.

Active or adaptive nature of a company when preparing to the future market conditions determines the nature and rate of changing of its strategy. Task of the management consists in finding the ways of improvement of the existing strategy and monitoring its realization. However, in crisis conditions the market uncertainty sharply increases, it passes from the operational to macro level and extends to the business macro environment factors: economic, political, social, etc.

Demand drops, competition increases, new risks come into being, and consumer behavior critically changes. Under such conditions all strategic management tasks not only remain urgent but also take on an operational nature and should be dealt with in a real time operating conditions considering the changes of the environmental conditions uncertainty.

Environment instability forces the enterprise management systems to:

employ a set of instruments for taking effective decisions under conditions of environment uncertainty and risks caused by the latter;

skillfully and promptly revise purpose-oriented business model: objectives, strategies, structures, functions and business processes;

promptly master new management methods.

For the enterprise to become capable to efficiently correct its strategy and implement structural changes in compliance with environmental changes taking place in the bifurcation point, it is necessary to employ a system for constant monitoring of the influence factors. To construct such a system, it is required to select special instruments for identification and reception of the environmental information.

Taking into account the present-day phase of the world and Russian economy development, the problem of finding and introduction into practice of new forms and methods of management making possible the quick adaptation to uncertainty through diversity of managerial decisions takes on a special significance.

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THE ACTUALITY OF THE PRODUCTION OF KNITTED FILTER MATERIALS WITH METALLIC THREADS

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It is very critical today to improve the competitiveness of Belarusian textile companies. The production of textile filter materials for industrial needs (technical textile materials) is widespread today. It's necessary to examine carefully all the characteristics of textile materials in order to choose the one that will be appropriate to these or those conditions. This choice depends not only on technical but also on cost characteristics.

The usage of multilayer warp knitted fabrics of polyester yarn as a filter element is a promising technology. Knitted filter material can be defined as knitwear of increased thickness, surface and volume filling, so this material has the advantages of three-dimensional and surface filters. Researches showed that knitted filters have a lower cost per unit at almost the same permeability in comparison with paper and textile filters.

This type of material also has a number of technological advantages such as high strength, good reconditioning, chemical resistance, low hydraulic resistance [1].

The advantage of machine knitting technology in comparison with woven or nonwoven webs is the possibility of forming a specific spatial structure in a single process cycle without additional processing steps.

It is proposed to develop a multi-layer warp knitted material for industrial purposes using metallic threads. It will provide the material with new properties such as increasing of the elongation at break, reducing the level of surface resistivity.

The study of patent literature has shown that the database has little information of the patenting of filter materials with metallic threads as well as methods of their manufactuing.

Thus, the usage of multi-layer knitted filter material will expand the range of products and reduce the cost of the filter. It will also improve the competitiveness of products and companies.

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INFORMATION SYSTEM OF LONG SCUTCHED FLAX QUALITY CONTROL

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Modern requirements to the quality of the products of textile enterprises, the rapid change in market demand for products, the rapid change of the range of products, changing assortment of recycled textile fibers require the use of modern information systems for the analysis and quality control of manufactured textile enterprises. RUPTE "Orsha Linen Mill" is the largest enterprise in the CIS and Eastern Europe producing goods from flax and combines in its structure technological processes covering the entire production cycle, from scutched flax fiber to finished garments. At the same time quality control of products and flax spinning is carried out both in the laboratory of input control and laboratory of spinning mills.

For quality control of flax fiber the specialized software and hardware complex was developed. Due to significant scale of the RUPTE "Orsha Linen Mill", the developed complex is geographically distributed among mill laboratories and includes a central server that provides data storage and processing of physical and mechanical properties of flax fiber, and mobile laboratory workplaces, providing access to all features of the complex. In the development of software and hardware complex modern information technologies for the storage and statistical data analysis, reporting, and remote data access using a corporate computer network have been used. Centralized storage allows to operatively provide simultaneous access to the relevant data to all users of the complex with the corresponding access rights.

During the development of the complex web-based approach was used, in which the system is a client-server web-based application where the web server acts as a server, and the web browser – as a client. This architecture is modern and has a number of advantages over classical architecture, in particular, it does not require the installation of an additional non-standard software on client devices and allows to upgrade complex software easily. The developed system is platform-independent. The server part can run on any operating system for which there is a realization of the web server (most of modern operating systems). The client part (the web browser) is available in any modern operating system (including mobile platforms) and does not require installing any additional software. The system is easily portable, allowing without any additional difficulties to expand and upgrade the hardware and software of the server. The client-server architecture allows for centralized data storage, which facilitates maintenance and administration of the system. The system allows users to organize access to it from anywhere in the enterprise, if you have access to a local area network (including the use of wireless technologies), and, if necessary, from anywhere in the world via the Internet.

The server part of the system operates using four components: a web server (Apache), a program code of the system written in an interpreted server-side programming language (PHP), database management system (MySQL) to store data and programming environment for statistical data processing (R). The server part runs under control of Debian GNU/Linux network operating system. Both stationary PCs running Windows OS and mobile devices running Android OS can be used as client devices.

The information system of quality control allows for automated estimation of the ability of spinning flax fiber in accordance with current legal regulations. Also the developed system allows to carry out a statistical analysis of change of physical and mechanical properties of flax fiber during processing and to conduct operational control and comparative analysis of physical and mechanical properties, quality and volume of deliveries taking into account the regionalization of flax and flax breeding.

For all interested persons in the information system of quality control interfaces for data input and for the formation of various types of reports are implemented. Software modules of the information system implement modern methods of estimation, control and forecasting of physical and mechanical properties of the

spinning products and yarn and allow to increase the quality of linen fabrics produced by RUPTE "Orsha Linen Mill."

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SPECIFICS OF FUNCTIONING OF CENTRAL BANKS IN THE USA AND BELARUS: COMPARATIVE DISCRIPTION

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The Central Bank has a special place in the monetary system of the country. It is the main institution, which executes the monetary policy and performs other essential governmental functions.

The Federal Reserve System is significantly different from most central banks in the world. The Federal Reserve System, also known as the «The Fed», is an independent U.S. government agency. Its most important function is to manage the country's supply of money and credit.

The National Bank of the Republic of Belarus (hereinafter referred to as the "National Bank") is the central bank and a government agency of the Republic of Belarus. The main objectives of the National Bank are: protecting the Belarusian ruble and ensuring its stability, including its purchasing power and the rate of exchange relative to foreign currencies; maintaining the stability of the banking system of the Republic of Belarus and ensuring efficient, reliable and secure functioning of the payment system. Profit making is not the main objective of the National Bank [2].

The Federal Reserve System includes 12 regional Federal Reserve Banks and 25 Federal Reserve Bank branches. All nationally chartered commercial banks are required by law to be members of the Federal Reserve System; membership is

optional for state-chartered banks. In general, a bank that is a member of the Federal Reserve System uses the Reserve Bank in its region in the same way that a person uses a bank in his or her community. The Federal Reserve System is administered by the Federal Reserve Board of Governors, a group of seven individuals who are appointed by the President of the United States and serve overlapping 14-year terms. Although the Federal Reserve System is directly responsible to Congress, the governors are, by law, independent of political pressure from either Congress or the President. The board is expected, however, to coordinate its policies with those of the administration and Congress. Additionally, the Federal Reserve does not rely on Congress for funding; it raises all of its own operating expenses from investment income and fees for its own services. When a conflict arises between making a profit or serving the public interest, however, the Fed is expected to choose the latter [1, p. 127].

The National Bank operates exclusively in the interests of the Republic of Belarus. The National Bank operates independently. The National Bank is accountable to the President of the Republic of Belarus. The National Bank comprises the main office and organizational units in every region of the country. The management body of the National Bank is the Board of the National Bank, a collective body that establishes key areas of activity of the National Bank and administers and governs it. The Chairman and members of the Board of the National Bank are appointed by the President of the Republic of Belarus, with the consent of the Council of the Republic of the National Assembly of the Republic of Belarus for 5-year terms [2].

Monetary policy of the central bank is the process by which the central bank controls the supply of money, the amount of credits, interest rates and other indicators of money circulation and financial markets.

The Federal Reserve has three main tools for maintaining control over the total supply of money and credit in the economy. The first is the discount rate, or the interest rate that commercial banks pay to borrow funds from Reserve Banks. By raising or lowering the discount rate, the Fed can promote or discourage borrowing and, thus, alter the amount of revenue available to banks for making loans [1, p. 128].

Interest rate policy, as one of the most important tools of monetary policy, due to changes in the value of borrowings provided by the National Bank allows the National Bank to affect the level of credit resources demand and supply, the volume and structure of the money supply, the level of bank liquidity, etc. This policy is reflected in the establishment and periodic review of the official refinancing rate and interest rates on its main financial market operations.

The second is the reserve requirement. These are percentages of deposits, set by the Federal Reserve, that commercial banks must set aside either as currency in their vaults or as deposits at their regional Reserve Banks. These percentages cannot be used for loans. In 1980 the Federal Reserve gained the authority to set reserve requirements for all deposit-taking institutions [1, p. 129].

Reserve requirement policy which is held by the National Bank (the proportion of total assets that banks must hold in reserve with the central bank), is used to influence the liquidity of banks and to regulate credit expansion.

The third tool, which is probably the most important in the USA, is known as open market operations. It is the buying and selling of government securities. When the Federal Reserve buys government securities from banks, other businesses or individuals, it pays for them with a check (a new source of money that it prints) drawn on itself. When this check is deposited in a bank, it creates new reserves—a portion of which can be lent or invested—further increasing the money supply [1, p. 129].

The National Bank's open market operations are limited due to lack of development of the Belarusian stock market. But they are the main instrument for regulating banking system liquidity. They are presented in Belarus mainly by transactions in government securities and securities of the National Bank.

These tools allow both the Federal Reserve and the National Bank to expand or contract the amount of money and credit in economy, and regulate the liquidity of the commercial banks.

Considering specifics of functioning of Central Banks in the USA and Belarus we can make the following conclusions:

1. Due to the relatively short period of development of the Belarusian financial system, as well as the objective possibility of centralization of certain management functions in this area, the National Bank focuses on the main objectives on the ensuring stability of the Belarusian ruble and secure functioning of the payment system (The highest authority of the United States which is in charge of calculation across the country, is a special Interdistrict Settlement Fund in Washington).

2. Specifics of governance structure of the US central bank are the result of a long historical development of the banking sector, a complex interlacement of political and socio-economic factors. Formation of the National Bank structure was based on the best management practices mainly of the Western European central banks.

3. Methods and tools of monetary policy used by the US and the Belarusian central banks, their objectives are mainly similar. Individual differences are due to different approaches to following the market economy laws and, as a consequence, to the economic situation.

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THE THEORY AND PRACTICE OF CORRELATION BETWEEN SUSTAINABLE DEVELOPMENT AND INNOVATIONS IN THE EU

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The principles of economic sustainable development were established in the EU (European Union) in the 1990s. The Sustainable Europe Research Institute − a Pan-European institute exploring sustainable development options for European societies − was set up in September 1999. The first Framework Programme for Research and Technological Development was launched in 1984. All these facts indicate of imposing European history and big experience in these areas. And, to talk the truth, both of these areas always have a big correlation either in scientific researches, economic theories, academic journals, research doctorates or in usual business strategies of almost every European company.

Traditionally in modern economies unlike the native economies and the economies of some post-soviet countries (Russian Federation, Ukraine) the model of sustainable development includes three main components ("three pillars" of this concept): corporate social responsibility, ecological environmental policy and, of course, economy based on the drivers of growth and competitive advantages – innovations.

These principles of macroeconomic sustainable development were also established in the 8th new EU Framework Programme (or FP8). On 1 January 2014 the EU launched a new research and innovation funding programme called Horizon 2020. Over the next 7 years almost 80 billion euros will be invested in research and innovation projects to support Europe's economic competitiveness, sustainable development and extend the human knowledge. The EU research budget is focused mainly on improving everyday life in areas like health, environment, transport, food and energy. Horizon 2020 will have a big focus on turning creative ideas into marketable products, processes and services, as its managers have said recently. Let's explore and describe this ambitious programme in detail.

By 2050 the world population may reach 9 billion people with two fifths over 50 years old. Three quarters of the global population will live in cities, and over 60 % will live in small households − alone or with one other person. These profound demographic changes will take place in the course of just a few decades. This is why a substantial part of Horizon 2020 is also dedicated towards finding responses to issues such as stable energy supplies, global warming, public health, security of water and food resources. Investing in research and technology is the only way to support resource efficiency and diversity, protect the environment and exclude poverty − shortly, to create a better society for citizens.

Firstly, the EU research and innovation is an investment in people's health as it will keep older people active and independent for longer, support the development of

new, safer and more effective interventions and help health and care systems to remain sustainable. Horizon 2020 projects (like NAD project) will give doctors the tools they need for more personalized medicine, and it will step up prevention and treatment of chronic and infectious diseases and help to fight antimicrobial resistance. The return on this investment will include new ways to prevent disease, better diagnostics and more effective therapies, as well as the uptake of new models of care and new technologies promoting health and well-being. These rely on a better understanding of the fundamental nature of health and disease.

Secondly, food security and sustainable use of biological resources is another main theme of Horizon 2020 projects such as Performance. Eating well, wasting less and knowing the origin of the food you buy for yourself and your family are the issues of concern to European citizens. With the world population growth there is a need to find ways to radically change our approach to production, consumption, processing, storage, recycling and waste disposal for minimizing the environmental impact. This will include balancing the use of renewable and non-renewable resources, transforming it into more valuable resources, the sustainable production of food, bio-based products and bioenergy. The bioeconomy holds the key to this shift towards a new post-petroleum society encompassing sustained changes in lifestyle and resource use that cut across all levels of modern society and economy. The welfare of Europe's citizens and their generations will depend on how these transformations are made.

Global demand for food is expected to increase by 70% by 2050, which will give a big pressure on agricultural sector. Feeding the world without damaging the environment is the important goal. That's why the EU is investing over 4 billion euros in research and innovation for a European bioeconomy, agriculture, securing of food production, sustainable management of natural resources and supporting this development in rural areas.

Thirdly, the investment in innovations to support a green economy (Ice2sea, AMPERE Project) — an economy that is in sync with the natural environment – is too significant. With natural resources becoming scarcer, encouraging a more sustainable use of our limited natural resources is essential for Europe's economic development. One way of doing this is by minimizing waste production, reusing waste as a resource, boosting innovative waste prevention, reducing Europe's dependency on imported raw materials.

Fourthly, innovations in sustainable energetics (Somabat, Labohr, ORION projects) are essential for the EU to spark a new industrial revolution that will deliver a low-energy economy, while creating a new standard of living and providing modern conveniences more secure, competitive, affordable and sustainable.

Fifthly, the efficient and innovative transport is a fundamental condition for sustainable prosperity in Europe. Everybody knows that mobility drives employment, economic growth and global trade, provides vital links between people and communities. However, modern transport systems and habits are not sustainable. Our current approach is too dependent on oil, giving us such problems as road congestion, atmosphere pollution impact on our health. If nobody solves these challenges, the

global economy could be severely restricted, the quality of our life could be eroded forever.

And in the end ensuring the security of citizens is one of the primary obligations of any country. Without safety and security as its basis, society cannot thrive. Governments keep citizens secure by fighting crime and terrorism, protecting them against natural or man-made disasters, providing effective cyber-security and protecting borders against illegal trafficking. But while ensuring the security of citizens is an essential task of any administration, it is also a highly sensitive area that needs to incorporate respect for privacy and the safeguarding of fundamental rights. The respect of privacy and individual freedom is thus at the heart of the EU security research and innovation projects as, for example, the Tabula rasa consortium.

As you can see, Horizon 2020 brightly demonstrates a high correlation between sustainable European development and innovations, which all in all gives a powerful multiplier effect. The cooperation of these areas is needed to recruit new talents for science, to marry scientific and innovative excellence with social awareness and responsibility and to deliver more breakthroughs, discoveries and world-firsts by taking great ideas from labs to market.

Innovations alone are rarely the key to unlocking economic and social value, but it induces really creative and useful ideas when they are combined with concept of the sustainable development. Research and innovations contribute to make Europe a better place in which people can live. They improve Europe's competitiveness, boost growth and create new jobs. They help make people's lives better by improving healthcare, transport and countless new products and services, planting the seeds from which new industries and markets grow. All innovative projects which were described theoretically in this article will lead Europeans and their generations to the sustainable development in practice in the nearest future.

NEW CHAIN STITCHES

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New chain stitching machines have been increasing their share in total nomenclature of sewing equipment from year to year for the sake of known advantage in comparison with shuttle stitching machines and also due to constant enlargement of assortment of sewing materials. These types of machines are manufactured by dozens of firms all over the world; the number of machine classes and their modifications is already measured by hundreds and constantly increases. At the same time technological processes, e.g. types of stitches made by this equipment are very seldom renowned. There are only 72 types of chain stitches, and

correspondingly the same number of ways of their formation (among them, there are only 41 types of stitches belonging to multi-thread chain ones). Even fewer ways are implemented in manufacturing equipment.

These circumstances slow down the improvement of perspective types of equipment and the enlargement of their application scope.

The task of this study is the development of new technological processes (ways of formation of multi-tread chain stitches) and the equipment for their realization.

The object of the study is the provision of required consequence of operations for the formation of new-type multi-tread chain stitches and co-work of machine's working elements in these operations.

In the development of new ways of chain stitch formation the known method of a system analysis is used, where the object (way) is estimated with elements of heuristics as a system with all its factors.

In the processing of fabrics and knitwear material, lines of Type 403 and Type 407 stitches are widely used (Fig. 1a, 1b). In particular, they serve for knitwear damping, sewing the laid-on gusset on, sewing elastic band belts on etc.

The main moments of co-work of machine's working elements during the formation of aforementioned stitches are so-called moments of pick-up (Fig. 1d), when the looper's tip consequently picks up needle loops and moments of clipping (Fig. 1e), when each needle drops into the corresponding thread triangle, formed by branches of looper's thread loop and corresponding previous needle loop.

The main problem of provision of reliable co-work of working elements is for the first moment a necessity of a reliable consequent pick-up of all three needle trade loops by a single looper. At clipping, simultaneous presence of three loops at one looper might result in dropping needles into wrong triangles, which will break stitch structure.

Aforementioned circumstances, firstly, limit width of No. 407 stitch (its maximal size is 6 to 6.2 mm), and, secondly, make adjustment of flat seam machines more complicated (their repair complexity is 5 to 6 nominal units which exceeds even that of some sewing semi-automatic machines).

Above that, using of such structure of stitch, in which sewed materials are jammed by triple-thread lines from one side and by laid-out single-thread loops from other, leads to thread over-expenditure and irregular stitch elasticity on opposite sides of materials.

The same problems also arise when No. 403 stitch is used.

One more representative of multi-tread chain stitch is Z-type No. 405 stitch (Fig. 1c), the lines of which found their application at sewing laces onto knitwear goods, braid etc.

Aforementioned basic moments of its formation are similar to that of No. 403 and No. 407 stitches; however, needle co-work with the looper in these moments is also complicated as needles have some horizontal offset in addition to a vertical one. This circumstance has large impact on reliability of stitch formation process, that is why its maximal width in existing sewing machines does not exceed 3-4 mm; it essentially reduces its application scope.

Authors have developed the ways of formation of such-like stitches with new structure which are patented in State Patent of Ukraine and do not have disadvantages stated above. Maximal width of these stitches (Fig. 2) might several times exceed the width of existing stitches; co-work of working elements during their formation also runs in more reliable way.

a) b) c)

d) e)
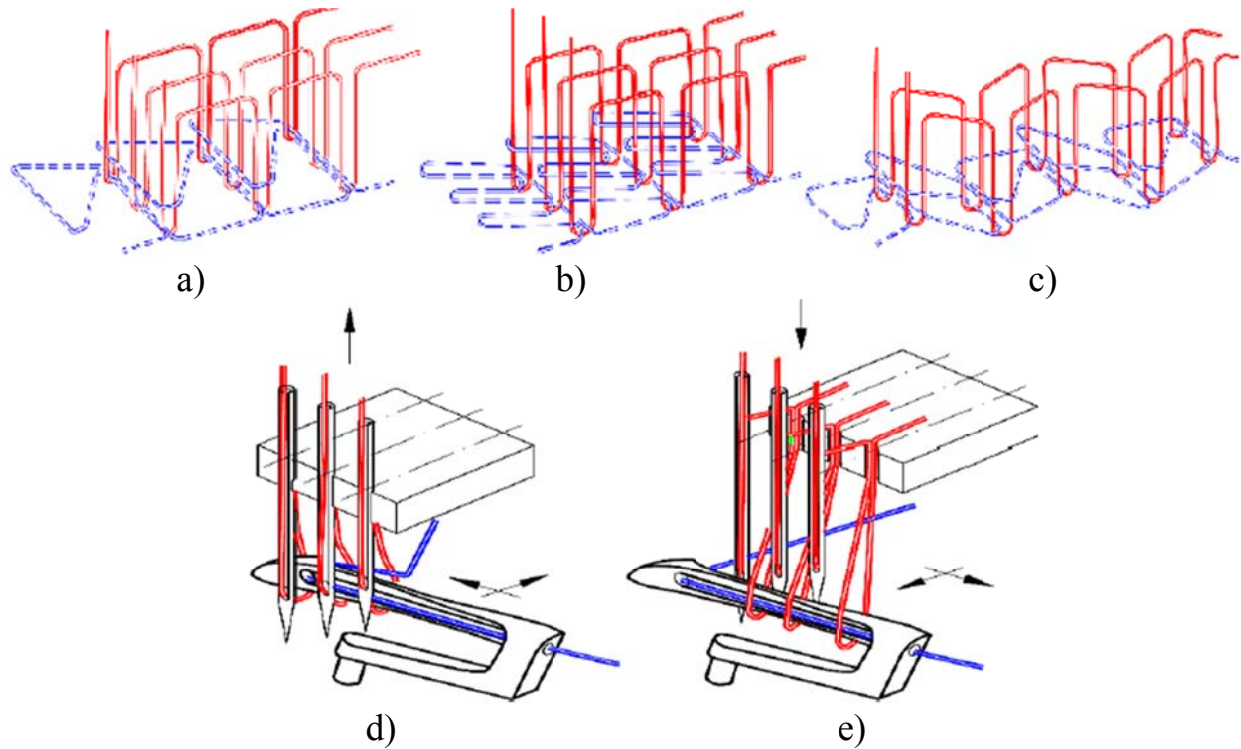
Figure 1 - a), b), c) – structure of No. 403, 407 and 405 stitches, d), e) – the main moments of co-work of working elements during the formation of flat chain stitches

a) b)
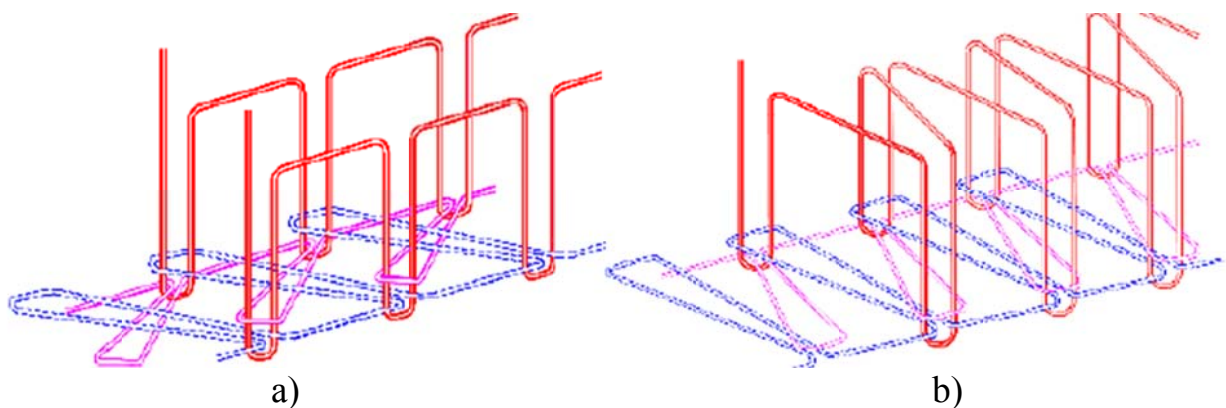
Figure 2 – structure of new type of stitches:
a) four-thread flat chain stitch, b) – triple-thread chain Z-type stitch

UDC 004.4: (658.56.378)

PROCESS MODELLING OF EDUCATIONAL ACTIVITY OF HIGHER EDUCATION INSTITUTION

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The general research problem is development of the model of a control system of higher education institution. Any modern organization making production, or providing services doesn't do without quality management system (QMS). One of the main elements of quality management system is the business processes model [1]. There is ISO 9001 quality management system standard that regulates process of development and structure of QMS.

Recommendations for the application of ISO 9001: 2000 in education were proposed at the intermediate meeting IWA 2 International Task Group Tralee, 2007 [2].

The higher education institution is a specific organization which has two directions of primary activity: training of specialists and science research activity. It is obvious that in this case at the A0 level of business process model there will be two processes: "educational activity" and " research activity". Each of these processes forms its own hierarchies of subprocesses. In this research the business processes model of educational activity of higher education institution was considered.
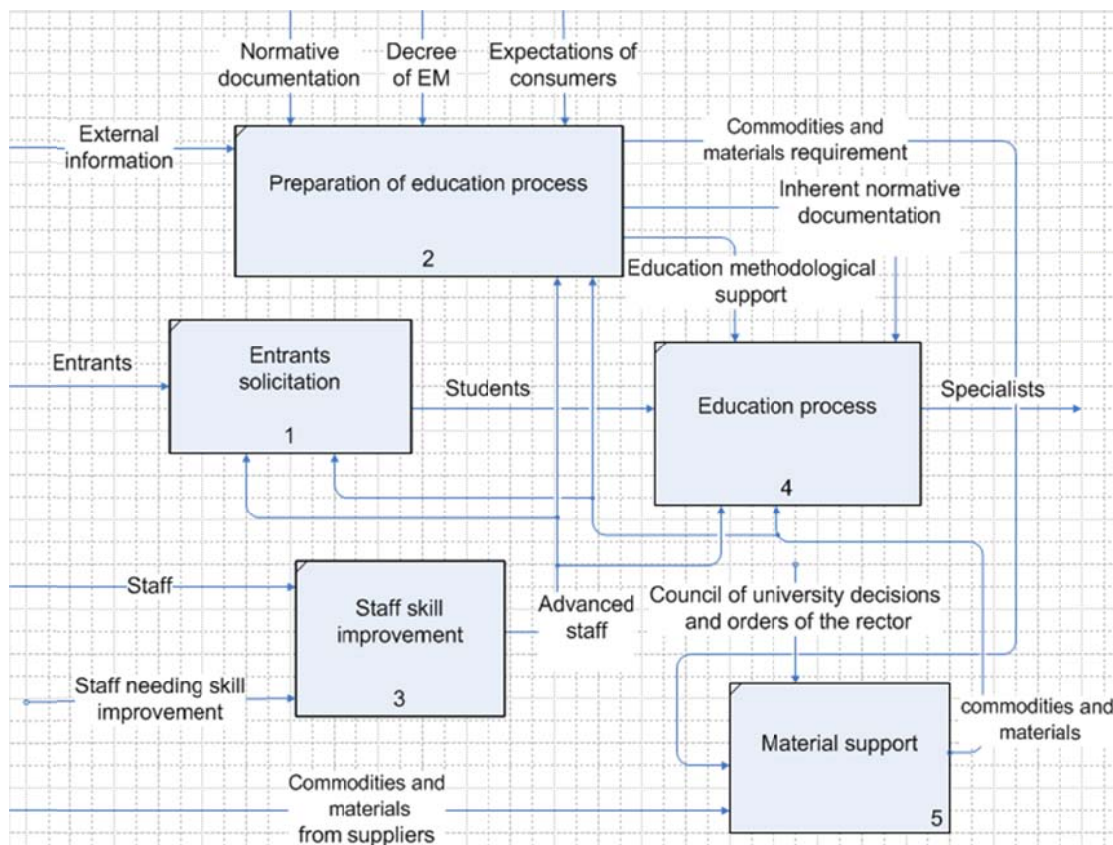
Figure 1 – Decomposition of process "educational activity"

Analogs of QMS standard objects and processes in managerial activity of higher education institution were revealed. After that decomposition of process "educational activity" was made. For determining of processes two main criteria were used [3]:

the process has to take place within one structural unit;

the process has to transmit object of management from an initial state into final, or intermediate.

At the following stage the information and commodity flows which connect subprocesses were defined. The chart A1 (figure 1) presents a result received.

The application Business Studio was used to build the model. This app has a lot of tools for visual design models and their analysis.

The developed model will allow to optimize business processes of a higher education institution, and also to carry out its reengineering.

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UDC 621.01

KINEMATIC ANALYSIS OF THE WARP KNITTING MACHINE MECHANISM

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Let's consider a six-link double-crank mechanism for FNF warp knitting machines (England), kinematic diagram of which is shown in Fig. 1.

According to Artobolevskyi's classification [1] the mechanism refers to the complex mechanism of the third class.

Initial parameters for kinematic studies of the mechanism are the angular velocities of the links *1,2* (ω_1, c^{-1}; ω_2, c^{-1}), and the scale lengths of the mechanism kinematic scheme (Kl, m/mm), shown in Fig. 1.

Projecting of speeds plan begins in undefined random scale $\left(Kv(\omega_2 = 0), \frac{m/s}{mm} \right)$, provided that the host link 2 is stable (Fig.2).
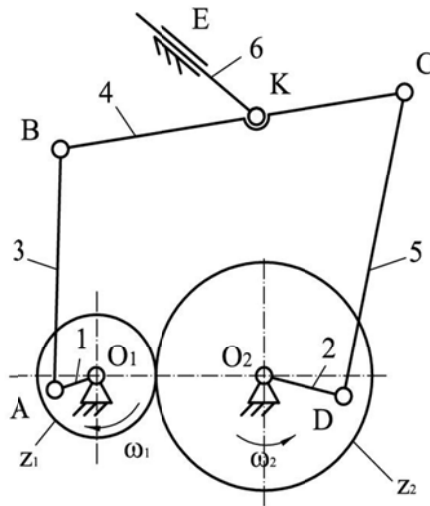
Figure 1 − The kinematic scheme of the mechanism
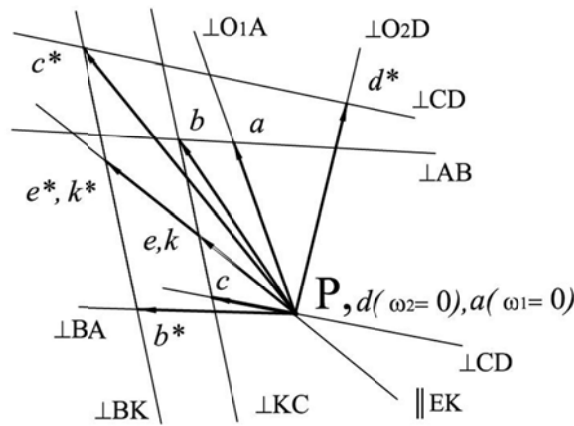
Figure 2 − The plan of the speeds

We examine the mechanism in the sequence caused by the other conditionally possible driving link 5 [2].

On the scheme from the pole P we draw a vector of a random length $\overline{Pc}$ in a direction that coincides with the perpendicular to the DC sector (the direction of the angular velocity ω_5 is random, for example, anticlockwise direction).

A system of vectors' equations to determine the K point velocity is composed:

$$\left\{ \begin{array}{l} \overline{V}_K = \overline{V}_C + \overline{V}_{K;C}; \\ \overline{V}_K \| KE. \end{array} \right\} \tag{1}$$

The vector $\overline{Pk}$ is defined on the scheme. Following the theorem of similarity and system of vectors' equations:

$$\left\{ \begin{array}{l} \overline{V}_A = \overline{V}_B + \overline{V}_{A;B}; \\ \overline{V}_A = \overline{V}_{O_1} + \overline{V}_{A;O_1}, \end{array} \right\} \tag{2}$$

The vectors $\overline{Pb}$ and $\overline{Pa}$ are correspondingly defined on the scheme.

The resulted vector construction is considered as the scheme, which in vector form establishes the relationship between the linear velocities of the mechanism points in a conditionally stopped crank 2. Attention is paid to the fact that the resulted direction of the vector $\overline{Pa}$ must match a specified direction of the angular velocity of a driving

crank 1. In the case of discrepancy it is necessary for the construction to be repeated, provided the vector of other lengths or opposite direction to be drawn.

The scale level of the received plan of velocities for the case of conditionally stationary crank 2 is calculated:

$$Kv(\omega_2 = 0) = \frac{V_A}{Pa} = \frac{\omega_1 l_{O_1 A}}{Pa} = \frac{\omega_1 (O_1 A \cdot Kl)}{Pa}, \quad \left[\frac{m/s}{mm}\right]. \tag{3}$$

To analyse the effect of the crank 2 movement on the parameters of the driven links of the mechanism, the crank 1 is conditionally stationary. The following procedure is specified by other conventional possible driving section 3: a vector of a random length $\overline{Pb}*$ is drawn on the scheme in a direction that coincides with the perpendicular to the section AB (the anticlockwise angular velocity ω_3 is random).

A system of vector equations is composed:

$$\begin{cases} \overline{V}_K = \overline{V}_B + \overline{V}_{K;B}; \\ \overline{V}_K \| KE; \\ \overline{V}_D = \overline{V}_C + \overline{V}_{D;C}; \\ \overline{V}_D = \overline{V}_{O_2} + \overline{V}_{D;O_2}, \end{cases} \tag{4}$$

this allows denoting the vectors $\overline{Pc}*$, $\overline{Pd}*$ following the theorem of similarity. According to the direction of a given angular velocity ω_2, the direction of the resulting vector $\overline{Pd}*$ is verified. The scale value of the velocities' plan for the case of conditional stationary crank 1 is calculated:

$$Kv(\omega_1 = 0) = \frac{V_{D*}}{Pd*} = \frac{\omega_2 l_{O_2 D}}{Pd*} = \frac{\omega_2 (O_2 D \cdot Kl)}{Pd*}, \quad \left[\frac{m/s}{mm}\right]. \tag{5}$$

The module of the absolute velocity V_K of the initial link 6 is defined as an algebraic sum of the $\overline{V}_K(\omega_1 = 0)$ and $\overline{V}_K(\omega_2 = 0)$ vectors modules (the vectors are directed along one line):

$$V_K = V_K(\omega_1 = 0) + V_K(\omega_2 = 0) = Pk* \cdot K_V(\omega_1 = 0) + Pk \cdot K_V(\omega_2 = 0), \; m/s, \tag{6}$$

$V_K(\omega_1 = 0)$, $V_K(\omega_2 = 0)$ - module of velocity point K - when $\omega_1 = 0$, $\omega_2 = 0$.

To determine the absolute velocities of the other points of basic link of the third class Assure's, the rule of vector addition of the corresponding velocity vectors is applied:

$$\overline{V}_C = \overline{V}_C(\omega_1 = 0) + \overline{V}_C(\omega_2 = 0) = \overline{Pc}* \cdot K_V(\omega_1 = 0) + \overline{Pc} \cdot K_V(\omega_2 = 0), \; m/s; \tag{7}$$

$$\overline{V}_B = \overline{V}_B(\omega_1 = 0) + \overline{V}_B(\omega_2 = 0) = \overline{Pb}* \cdot K_V(\omega_1 = 0) + \overline{Pb} \cdot K_V(\omega_2 = 0), \; m/s, \tag{8}$$

$\overline{V}_C(\omega_1 = 0)$, $\overline{V}_B(\omega_1 = 0)$, $\overline{V}_C(\omega_2 = 0)$, $\overline{V}_B(\omega_2 = 0)$ − velocity vectors for C, B points of link 4 when $\omega_1 = 0$ та $\omega_2 = 0$.

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UDC 621.01

STRUCTURAL ANALYSIS OF THE WARP KNITTING MACHINE MECHANISM

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To improve an existing engineering equipment of the light industry and designing of new reliable and efficient machines, there arises the need for structural-kinematic analysis of their composing mechanisms.

Let's consider a six-link double-crank mechanism of a FNF warp knitting machine (England), the structural scheme of which is shown in Fig. 1
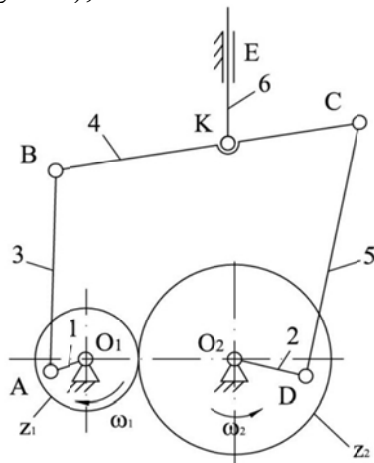
Figure 1 − The structural scheme of the mechanism

The mechanism consists of six moving links ($n=6$) and eight kinematic pairs ($P_5=8$), so the degree of freedom is equal to: $W=3n-2P_5-P_4=3·6-2·8-0=2$.

The leading links are cranks 1 and 2, so the formula of the mechanism structure according to Assur [1] has the form shown in Fig.2, and the mechanism itself refers to the complex mechanism of the third class.
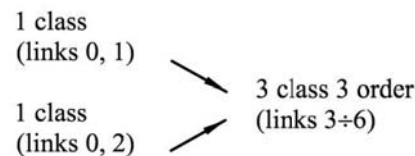
Figure 2 − The formula of the structure

To determine the kinematic parameters of the mechanism with several leading links the method of a leading link conditional stop is used, this allows determining the effects of one of the leading link, moving left, on the kinematic parameters of the other driven links. Having determined the effect of each of the leading links on the kinematic parameters of the driven links, we calculate the absolute value of the kinematic parameters of the driven links.

For our case study, the first necessary step is a conditionally stop of link 2 and estimation of the effect of the crank 1 movement on the movement of driven link 6, and only then to repeat the analysis when link 1 is stopped in order to calculate the kinematic parameters of the driven link, which is caused by the crank 2 movement.

The applicacion of an analytical method for kinematic studies of such a mechanism is due to the large number of closed contours and, as a result, the complexity of algebraic equations systems, which are solved only by approximate mathematical methods for the third class groups of Assur [2].

To determine the sequence of kinematic studies of the mechanism we use a capability of the highest class mechanisms to change the class in a conditional adjustment of an initial mechanism. In order to determine the effect of the movement

of the driving link 1 on the kinematic parameters of the driven links of the mechanism we consider another link 2 to be stable.

The formula of the mechanism structure is shown in Fig.3.

1 class   ⟶   3 class 3 order
(links 0, 1)   (links 3÷6)
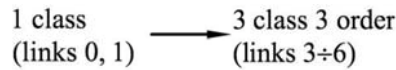
Figure3 − The formula of the mechanism structure

The mechanism is examined in the steps according to another possible driving link included to the group of the third class.

If the initial mechanism is chosen as a set of links 2 and 5 − the formula of the whole mechanism structure is shown in Fig. 4.

1 class   ⟶   2 class 2 order   ⟶   2 class 2 order
(links 2, 5)   (links 4, 6)   (links 1, 3)
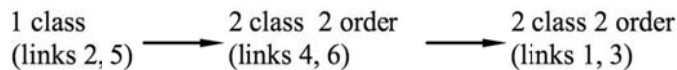
Figure 4 − The formula of the structure

If link 6 is conditionally selected as the driving member, the changes in the formula of the structure are observed among the links forming a structural group which is directly connected to the other conditional initial mechanism (Fig.5).

1 class   ⟶   2 class 2 order   ⟶   2 class 2 order
(links 0, 6)   (links 4, 5)   (links 1, 3)
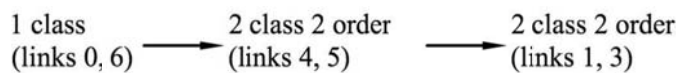
Figure 5 − The formula of the structure

For both cases of other conditionally driving links, the mechanism becomes a mechanism with the sequential connection of Assur's structural groups of the second class, thus it has become a kind of the second class mechanism in which the motion of conditionally leading link 5 (Fig.4) or link 6 (Fig.5) is undefined, and driven link 1 is preset.

To solve the problem of determining kinematic parameters of all links of the mechanism with the degree of freedom W=1 is possible under the specified parameters of its one link motion (optional leading), if the movement of the links in any mechanism is interconnected [3, 4].

To determine the effect of the link 2 motion on the kinematic parameters of driven link 6, link 1 is considered to be conditionally stationary. For the case of other possible primary mechanisms the formulas of the structures are shown in Fig.6 and Fig.7.

1 class   ⟶   2 class 2 order   ⟶   2 class 2 order
(links 1, 3)   (links 4, 6)   (links 2, 5)
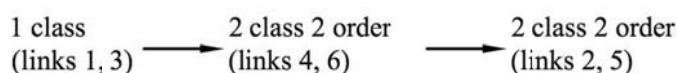
Figure 6 − The formula of the structure

1 class   ⟶   2 class 2 order   ⟶   2 class 2 order
(links 0, 6)   (links 3, 4)   (links 2, 5)
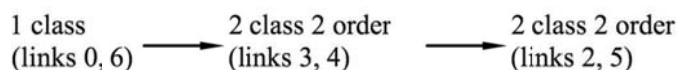
Figure 7 − The formula of the structure

From the analysis of the obtained formulas of the mechanisms we conclude that regardless of chosen conditionally leading link, upon further investigation of the mechanism in the following sequence, we deal with the mechanism of the second class, for which the kinematic analysis is statically defined.

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UDC 66.02

THE RESEARCH OF THE CAPILLARY-POROUS MATERIAL AS THE OBJECT OF THE TECHNOLOGICAL PROCESSING

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The drying process is one of the most common and energy-intensive processes of finishing production of textile enterprises, chemical engineering, agricultural processing and other industries. The analysis of material properties as the object of drying is very important when we chose rational power saving modes of drying materials [1, 2].

Among the most important characteristics of the wet solid, affecting the internal mass transfer, and, consequently, the duration of drying are porous structure, diffusion equilibrium and mass conductivity. The forms of the contact of moisture with the solid influence the character of the mass and heat transfer in it during drying.

For the destruction of the moisture binding, the strength of which depends on its energy the additional amount of heat must be expended to the heat of vaporization which is particularly significant in deep-drying [1, 2, 3].

The diffusion resistance of the material to the transfer of moisture in the drying process is determined by its porous structure [1,2,3]. Therefore, the characteristics of the porous structure are selected as the main material in the analysis as drying facilities.

Typically the porous structure of solids is characterized with common porosity, pore size, integral and differential pore volume distribution curve radially and the specific surface area.

As the object of research a typical capillary-porous material (CPM) is selected, achieving residual moisture content during drying is connected with the removal of free moisture, moisture macro- and micro vessels of transient pores.

The structure of the samples was researched by three independent CPM methods to obtain the most complete picture of it and the comparison of the characteristics [1, 2, 3]. The porosity was studied by the hydrargyrum porosimetry and electron microscopy, it was secondary to this material as a drying facility, and a finer structure was researched by the sorption method, which allowed us to assess the structural features of the structure of the material being dried.

Researches have shown that the CPM has a total volume of pores – 0,28 cm^3/g (apparent density − 1250 kg/m^3, the true − 1920 kg/m^3). The volume of pores with a radius of 100 Å defined by the hydrargyrum porosimetry was 0,03 cm^3/g, and the rest of the volume (0,25 cm^3/g) was finer pores, the structure of them was researched by sorption.

Sorption isotherm of water vapor CPM has the typical form of capillary-porous solids with a hysteresis loop in the relative pressure range from 0,45 to 1,10. The pore volume distribution according to radius was calculated by the desorption branch of the isotherm using Thomson-Kelvin equation [1, 2]. The maximum of the distribution curve corresponds to pores with R = 50 ÷ 60Å.

In the calculation of the equation by Thomson-Kelvin pore radii were corrected according to the approximate thickness of the membrane of moisture t_{pl} = 5,4Å, formed by the beginning of the capillary condensation: $t_{pl} = V_{ad}/S_{pl}$ where V_{ad} − the amount of the adsorbed phase to the beginning of capillary condensation, S_{pl} = 60 m^2/g − the membrane surface defined by the equation of A.V. Kiselev [4]:

$$S = \frac{1}{\sigma} \int_{\alpha_0}^{\alpha_\infty} A d\alpha , \qquad (1)$$

where σ − the surface tension of sorbate in the liquid state; And α_o α_∞ − values of sorption to the beginning of capillary condensation and P/P$_s$=1; $A = R \cdot T \cdot \ln \frac{P}{P_s}$ − differential sorption work.

Thus, the sorption measurements and hydrargyrum porosimetry showed that the bulk of the pore volume in pores CPM refers to the pores with a radius of less than 100Å.

The limited value of the sorption of water vapor is 30%.

The moisture of monolayer will be last removed in the process of drying CPM. The approximate value of the heat of its desorption can be determined according to the constant C BET equation [5]:

$$\frac{\frac{P}{P_s}}{\alpha \cdot \left(1 - \frac{P}{P_s}\right)} = \frac{1}{\alpha_m \cdot C} - \frac{C-1}{\alpha_m \cdot C} \cdot \frac{P}{P_s}, \qquad (2)$$

where P − the vapor pressure of the adsorbate, P_s − the saturated vapor pressure of the adsorbate, α − the amount of adsorbed vapor, $α_m$ − monolayer capacity, C − constant: $C = e^{\frac{E-L}{R \cdot T}}$, where EL − net heat of adsorption, R − gas constant, T − temperature of adsorption. The net heat of the desorption of the monolayer for the CPM is 8,55 kJ/mol, which characterizes a relatively weak link with the surface of moisture. BET specific surface area is 52 m^2/g, with the area of water molecules of 12,5 $Å^2$ [5].

The results of the research can be used in the analysis of the properties of textile and other materials as the objects of technological processing.

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FUNCTIONAL PROVISION OF THREAD CUTTING RELIABILITY OF SEMI-AUTOMATIC SEWING MACHINE

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Department of machines and devices for light industry (MDLI) of educational institution "Vitebsk State Technological University" in cooperation with JSC "Scientific and production bureau of design and research in machine building" (Vitebsk) has modernized the mechanism of multihead semi-automatic sewing machine. In the process of designing of automatic thread cutting mechanism a goal arose, to determine the degree of blade tension required to eliminate the offset of movable blade.

The object of our research is the range of tension required for elimination of possible mutual offset of thread cutting blades used in multihead semi-automatic sewing machines.

While designing thread cutting unit of multihead semi-automatic machine, it is necessary to foresee steps for elimination of possible parasite blade offset, caused by the impact of the sewing thread on blades. This impact during cutting process is estimated in [1]. The goal of designing is to estimate functional and technological factors, influencing on thread cutting quality, then determine the significance of these factors and make up formulas both in general and as a partial solution for multi-head semi-automatic sewing machines, which would help to improve the quality of manufactured goods.

Since in the process of thread cutting there occurs a parasite mutual offset of fixed and movable blades relative to X axis, it is necessary to foresee steps for its elimination at the stage of designing the mechanism. The factor of economic efficiency also put some restrictions on parameters of accuracy of parts of the mechanism. Therefore it is required to define the design criterion which would provide reliable thread cutting. This criterion, in general, appears as follows:

$$d_{min} \gg D_{max} = e \ D_i, \tag{1}$$

where d is a preliminary tension;

D is blade offset towards X axis, caused by technological (denote such offsets as D_m (Fig. 1)) and design (denote them as D_κ) parameters.

Among the technological impacts, the main one is found to be the blade offset caused by the application of force N_x which emerges at thread cutting. If both blades are movable, the force N_x makes them to move out of position, and, as a result, blades cannot complete cutting at its final stage. The residual thickness of uncut part of the thread within the line OO_1 is calculated from the congruence

$$D_m = D_{m1} + D_{m2}, \tag{2}$$

where D_{m1} and D_{m2} are the offsets of blade 1 and blade 2 respectively.
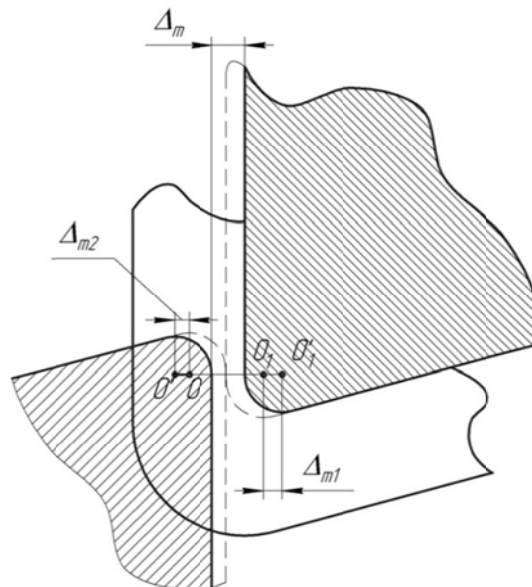
Figure 1 − Parameters of blade offsets

If only one blade is movable, we consider that this blade only moves into offset, i.e. $D_m = D_{m1}$.

Blade design flaws which result in offset occurrence are mostly presented by their shape defections and defections of tool's mounting face position relative to technological bases. Thus, the summary blade offset caused by one parameter or other is to be expressed by formulas:

For configuration with two movable blades:

$$D = D_\kappa + D_{m1} + D_{m2}; \tag{3}$$

For configuration with a single movable blade:

$$D = D_\kappa + D_m. \tag{4}$$

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TECHNOLOGICAL PROVISION OF THREAD CUTTING RELIABILITY OF SEMI-AUTOMATIC SEWING MACHINE

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To determine offsets, caused by technological reasons, we worked out the calculation model of cutting tool, shown in Fig.1. This model contains one moveable and one fixed blade. Here, 1 is a moveable detail (a holder) which holds the moveable blade 2.
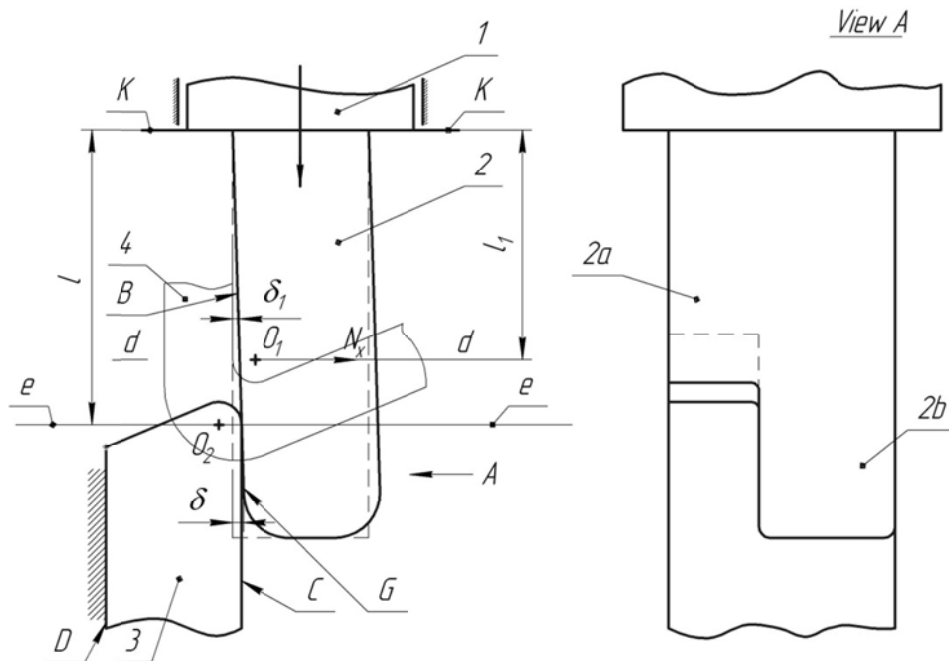
Figure 1 − Blade offset at thread cutting

The moveable blade has both cutting part *2*a and mounting part *2*b. The surface *G* of the mounting part constantly contacts with the surface C of the fixed blade *3*. The surface D of the fixed blade is rested upon fixed mount and practically not deformed while thread cutting *4*.

The offset of movable blade might be caused by force N_x, produced by the thread itself. Blade offset at d-d section is calculated as follows:

$$D_{T(d\text{-}d)} = \frac{N_x l_1^3}{3EI},\qquad(1)$$

Where E is a Young's modulus for moveable blade's material, H/м^2;

I is an inertia moment of moveable blade's cross-section, м^4;

l_1 is a distance between the center of moveable blade's attachment and the center of spherical radius of moveable blade's cutting edge, m.

For e-e cross-section which is characteristic for thread cutting, the moveable blade offset is:

$$D_{T(e\text{-}e)} = \frac{N_x l_1^3}{3EI} \cdot \frac{l}{l_1} = \frac{N_x l_1^2 l}{3EI}.\qquad(2)$$

For the initial moment of cutting, the length l_1 is expressed via distance l between the attachment point of the moveable blade and the center of spherical radius of moveable blade's cutting edge.

$$l_1 = l - (1 - e_u)D_M - r_1 - r_2,\qquad(3)$$

Where e_u is an elastic component of relative compression deformation of the material (sewing thread);

D_M is a thickness of the material (sewing thread), m;

r_1 – is a spherical radius of moveable blade's cutting edge, m;

r_2 – is a spherical radius of fixed blade's cutting edge, m.

For most cases, in accordance with formula (3) we will obtain the following:

$$l \gg l_1,\qquad(4)$$

It is acceptable even more, as the length used in formula (2) is of degree three. Formula (4) takes the following form then:

$$D_{T(e\text{-}e)} = \frac{N_x l_1^3}{3EI} \cdot \frac{l}{l_1} = \frac{N_x l^3}{3EI}.\qquad(7)$$

Formula (7) allows to determine the offset range in typical cross-section, using the resistance force N_x.

Blade offsets, caused by design flaws, will be found as follows:

$$D_K = T_b \frac{H}{l},\qquad(8)$$

Where T_b is a runout tolerance of the surface of moveable blade's hinge joint, mm;

H is a height of hinge joint, m.

The degree of tension in the condition (1) is determined under the formula:

$$d_{\min} = \left| \sum_j^{m-1} T_{Aj} \right|,\qquad(9)$$

Where T_{Aj} is a tolerance of j, i.e. one of the elements of dimensional chain of moveable blade's attaching unit, m.

Further calculations showed that newly-designed blade doesn't require any additional measures to provide adequate tension between moveable and fixed blade. Reliable thread cutting is provided only by the blade's design layout.

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LEADERSHIP STYLES IN EDUCATION

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A leadership style is a leader's style of providing direction, implementing plans, and motivating people [1].

There are different styles of leadership in education. Leadership styles in education have different effects on the overall learning process. They affect the leader i.e. the principal, their followers, i.e. the teachers, and those who are addressed, i.e. the students.

As the competitiveness in the world of education increases, the implementation of these styles becomes more and more important. The role of every individual starting from the principal, teachers to the students is important, and the ultimate goal remains the enhancement and upkeep of the teaching-learning relationship. The job of every individual in this process is to create the necessary conditions for teachers to develop and execute their own teaching styles and methods, in a manner that is simple and most effective for students. Also, the development of other aspects of the educational framework, such as association with external groups that facilitate better teaching and learning, the care of the infrastructure, etc., all come under the purview of educational leadership. In education, the different leadership styles that are known to be most effective have been mentioned here. Ultimately, however, the type that will be most effective is one that suits the personality of the leader, i.e. the principal, and the openness of the group members, i.e. teachers, to the types that are implemented within the educational framework.

Instructional Leadership

It is also known as hierarchical leadership. Here, the principal is at the top of the ladder, where the decisions taken and actions delegated intend to promote student growth and learning. Thus, goal-setting, provision of essential resources for goal achievement, supervision of teachers, and coordination of the tasks necessary to achieve the goal come under the purview of the principal. For this method to be successful, the principal must continually seek the betterment of entire educational system, and possess a personality that will help in the implementation of the aforementioned requirements of instructional leadership. This is one of the rarely practiced styles in education, because in present days and time, a principal is expected to perform more managerial tasks than the instructional. Also, this method

has not proven very effective as it focuses only on the growth of the students, not the teachers. In education, leadership styles are meant to focus on collective growth that involves all members of the framework [2].

Visionary Leadership

In the educational framework, visionary leadership plays an important role. It is defined as the creation of a vision by the leader (principal), the implementation of which is then carried out by the members of the group (teachers). The vision here may or may not be shared, in that, it may generate solely in the mind of the principal for the teachers to follow and implement, or created and developed as a group. Whatever the case, the involvement of the group at all levels is essential, so that it is effectively executed. Ultimately, it is the teachers who have to execute it, thus involving them at the stages of planning itself is necessary. Furthermore, while the principal may have adapted to a new way of thinking, waiting till the teachers begin to adapt themselves to this vision is important. Not everyone is ready for a change, so providing enough time to respond and adhere to it matters. In order for this method to be successful, encouragement, planning, analysis, assessment, and development of the plan is essential. Simply by dreaming of a positive change that brings the educational framework into a new light, one cannot hope to realize the change. Here, it is the job of the principal to encourage this vision and ensure that it translates into a concrete reality at the grass-root level, i.e., the classroom. One may also consider this style to be a form of transformational leadership [3].

Facilitative Leadership

Contrary to the methods of instructional leadership that are traditional, the facilitative or participative leadership style, as the name suggests, refers to the involvement of the leader as well as the staff members in the process of decision-making and implementation. While the hierarchical structure remains the same, it is the involvement of every member in the decision-making process that makes it different from the other styles. Here, however, there is an issue of accountability, which does not lie in one hand, but may shift from person to person depending on the intensity and the outcome of the decision taken. Even if it is a group decision, one would consider the principal to be accountable as the leader of the educational organization. In such a case, first understanding the system, and preparing colleagues and staff members for the purpose of facilitative administration is essential. Depending on the personality and decision-making abilities of every individual, this style can be embraced over time. It can definitely enhance the performance of the teachers and prepare them for future administrative roles [4].

Ideally, everyone does possess some leadership skills that are then modified to suit the requirements of the framework and organization. Thus, for any of these methods to be effective, bringing those inherent leadership qualities to the fore will make the necessary difference, and bring about the required change. The development of a vision, and its execution based on planning and management is what will ultimately fulfill the necessities of educational leadership, and facilitate the relationship between teaching and learning.

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OPTIMIZATION OF STRUCTURE OF TERRY FABRIC

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The purpose of the work is definition of optimum structure of terry fabric for decrease in consumption of the loop warp and quality improvement. The studies were performed in the design of towels "Assol", produced from cotton yarn 25 tex × 2 in the warp and 29 tex in the weft in a production environment of company «Rechitsa textil».

To form hinge-weave yarns in any complexity based systems two threads are used - looped and ground that may be located in the tissue at a predetermined ratio – 1:1, 1:2, 2:2. Loopy fabric consists of two weaves – a weave of a ground warp with weft and an weave of a loopy warp with the same weft.

In modern terry fabrics with bilateral loopy effect on one of the parties the effect of the pile at the expense of cutting loops is created. Height of a loop is formed by the size gauss – distance from a fabric edge to the first laid the weft thread after surf through which both are nailed to the edge of the weft yarn forming element weave. We investigated influence of a type of the fixing weave and ratio of warp threads on formation of cutting loopy effect and structural parameters of fabric.

For formation of a uniform loopy surface it is necessary to have as often as possible loopy tufts (cutting loops) that semi-rep on a warp 1/2 is provided with fixing of a loopy warp in ground fabric on a weave. Use of an arrangement of threads of a warp at the ratio 1:1 (one ground, one loopy) promotes the best fixing of pile.

On the basis of theoretical design of loopy effect in terry fabric, according to schemes of structural fixing of a loopy thread, analytical expressions for determination of length of threads of the ground and loopy fabric going for formation

of a loop and calculation of their actual runner length are established. It is defined that the wave arrangement of threads in a loopy weave corresponds to about IX order of a phase of a structure at which threads a weft settle down practically at one level.

Length of a loopy thread in a loop of L_n (mm) depends on the gauss size of H formed at a soft battening, diameters of a thread a weft of d_y and loopy warp of $d_{o.n}$:

$$L_n = H + \pi \, (d_y + d_{o.n}) + d_y .$$

Length of the element of fabric created by one loop of $l_{mк}$ (mm) is defined according to geometrical model of loopy effect.

$$l_{mк} = R_y \cdot d_y + d_{o.n} + 2 \, d_{o.г} ,$$

where R_y – repeat on a weft of a loopy weave.

As at a rigid battening of a thread a weft move on strongly tense threads of a ground warp, there is an insignificant shift and threads of a loopy warp that influences height of the formed loop.

Loop height of B (mm) is determined by a formula:

$$B = (L_n - \pi \, (d_y + d_{o.n})) / 2 .$$

Runner length of the loopy warp (%) forming loopy effect

$$a_{o.n} = \frac{(H + \pi \, (d_y + d_{o.n}) + d_y - R_y \cdot d_y - d_{o.n} - 2d_{o.г}) \cdot 100}{H + \pi \, (d_y + d_{o.n}) + d_y} .$$

On the basis of the received theoretical dependences optimum structural characteristics of the Assol terry towels developed from a cotton yarn 25 tex × 2 in a warp and 29 tex in a weft are defined. The size of towels is 50 × 90 cm. Density of threads on a warp – 257 threads / 10 cm, on a weft – 190 threads / 10 cm, fabric weight – 365 g, the size of an runner length of a loopy warp – 300%, loop height – 4 mm.

PILOT STUDIES OF PARAMETERS OF THE STRUCTURE OF SEMI-LINEN COSTUME FABRICS

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For the last years keen interest of consumers in natural fabrics in clothes, including linen has been noted. The Republic of Belarus holds worthy position in terms of output and the amount of export of linen materials in the world market.

Linen is a peculiar brand according to which this fiber can justly be associated with our country. The linen household range needs to be updated due to formation of new structures of fabrics.

Proceeding from it, relevance of creation of competitive textile materials on the basis of flax is obvious. It will lead finally to increase in import substitution and

growth of interest among the sewing enterprises in the fabrics made in the Republic of Belarus.

The group of costume fabrics is one of the most perspective and high-growth linen fabrics from the range. Therefore, the need for continuous improvement of structure, appearance and the invoice of these materials is obvious. Natural effects of fiber, such as non-spin and roughness, create feeling of originality, hand-made effect and special expressiveness of materials.

Consumer properties of flax are rather high.

However indicators of properties of household fabrics of which products are made have to meet a number of the requirements providing, first of all, comfort, reliability and stability of a form.

In costume products the considerable area contacts directly with a body of the person therefore it is necessary to keep a certain level of hygienic properties which is defined by a type of a product, its seasonality, climatic conditions and age of the person.

The purpose is to update the range of the household fabrics developed at Republican unitary production enterprise "The Orsha linen factory" on non-shuttle weaving loom with the Jacquard machine Z-344. The technology of semi-linen costume fabrics of new structures which allows to create effective surfaces in material is developed: relief, granularity, longitudinal strip.

Along with development of fabrics of big area density the sufficient attention to development of the range of lighter fabrics is paid, it is offered to use for decrease in a material capacity of the projected semi-linen costume fabrics in a warp a pure-linen colored yarn of a wet way of spinning of linear density 56 tex, in a weft – a cotton yarn of linear density 34 tex.

Thanks to a special input of warp threads in the beat-up, the effect of a longitudinal strip in fabric was strengthened: 7 tooth of the beat-up with a 2-thread input in a tooth, 7 tooth of the beat-up with a 4-thread input in a tooth.

At installation on beat-up N 60 density on a warp in the front page makes 120 nit./10 cm, in the second strip – 240 nit./10 see. Two drawings of single-layer big-pattern interlacings are developed at one looming-up.

Researches of properties of the developed samples of costume fabrics were conducted according to standard techniques. The measuring equipment installed in technological laboratories of the factory and working in the modes specified in passports was used.

Values of indicators of tests of physical and mechanical properties of ready semi-linen fabric of the rarefied structure are presented in Table 1.

Table 1 − Physical and mechanical tests of ready semi-linen costume fabric of the rarefied structure

Name of an indicator	Values	
	standard of Belarus 1139-99	The projected sample
Width, cm	-	143,9
Number of threads on 10 cm: - warp - weft	-	213 227
Breaking loading, N: - warp - weft	not less 196 196	558 230
rea density, g/m2	-	187
Resistance to attrition, one thousand cycle.	not less 3,0	4,6
Air permeability, dm^3/m^2s	not less 60	583
Change of the sizes after wet processing, %: - warp - weft	no more - 6,0 - 4,0	+0,2 -2,6
Presence of free chlorine at the bleached fabrics	no	no
Amount of free formaldehyde, mkg/g	no more 1000	23,7
Stability of coloring: 1) to washing at 40 ° C 2) to sweat 3) to dry friction 4) to wet friction 5) to an ironing 6) to organic solvents	1) 4/4/4 2) 4/4/4 3) 4 4) 3 5) 4/5 6) 4	1) 4/4/4 2) 4/4/4 3) 4 4) 3 5) 4/5 6)4
Reaction of water extract	neutral	neutral

The analysis of data in Table 1 showed that semi-linen costume fabric of the rarefied structure on all indicators of physical and mechanical properties conforms to requirements of the Standard of Belarus 1139-99, and on some, in particular breaking loading, air permeability, resistance to attrition, exceeds several times.

The density made 187 g/m^2, a contraction on a warp of +0,2%, shrinkage on a weft of-2,6%. In these fabrics density and shrinkage of fabric are lowered.

Positive results of approbation of these materials at production of men's and women's clothing in the conditions of industrial production are received. Samples of semi-linen fabrics of the rarefied structure in a longitudinal strip and parameters of their structure and development are introduced in educational process of EI "VSTU".

UDC 677.024

DESIGN OF CLOTH FABRICS WITH PRINTING DRAWING

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Now creation of elite house eco-textiles which raw structure includes linen fibers is actual. The purpose of the work is to design real printing drawing for the woven cloth fabrics applied in an inhabited interior.

Research problems are as follows: to analyze types of the ornaments used in fabrics for an interior and the main trends of fashion for table fabrics; to define features of creation; to propose colors schemes for a collection of fabrics.

The analysis of information sources showed that for creation of the atmosphere of refinement and nobility modern designers recommend to combine the art and composite solution of cloths with napkins. Thus, sets can be smooth, colored or with jacquard drawing, to have the rapport, border, and closed pattern.

When studying history of table linen it is revealed that the desire to decorate the life grew from need of the person to dress stylishly. In every era the ornamental and coloristic solution of fabrics for an interior was defined in different ways: sometimes it was utilitarian qualities, sometimes decorative and esthetic values were put in the forefront. The patterns may be divided into the following types:

- the flower and vegetable, characterized by presence of the smooth, wavy, turbine lines giving grace and softness, softening an interior;
- the stylized ornaments and "Persian pickle" in which the visual object is represented conditionally, in the form of small curved elements;
- geometrical sets of the figures which are visually changing space;
- graphic where picturesque motives remind pictures;
- the exotic (fantasy), imitating skin of wild animals, palm trees, parrots, dragons, etc.;
- abstract, consisting of chaotically put spots, figures, fragments;
- coupon, applied to allocation on tone, color or drawing of vertical and horizontal surfaces.

For each historical era certain composite solutions of ornaments, drawing scale, a rapport arrangement, nature of its drawing on fabric are characteristic.

For example, it is revealed that in the current season Baroque style elements which passed into textiles for an interior from clothes fabrics are actual: natural raw materials, small drawing of vegetable subject, game of shadows, splendor and greatness of forms, curved lines, complex outlines of elements.

Results of the analysis were used for design of the main ornamental motive of cloth fabrics: one of the brightest and characteristic elements of Baroque is a grapevine, being a symbol of fertility, abundance and wealth.

The scheme of a pattern of a cloth is presented in Figure 1, in which the motive in a rapport grid is secular symmetric to rather vertical axis of symmetry, thus the lower

part of drawing is developed at an angle 45^0 for creation of effect of the horizontal movement (Figure 2, a).

For stylization the linear solution of the elements making drawing which most effectively reflects property of a plant to aspiration up is chosen, showing a form of branches, structure of material and successfully enriching imitates fabric drawing (Figure 1, b).

a	b	c
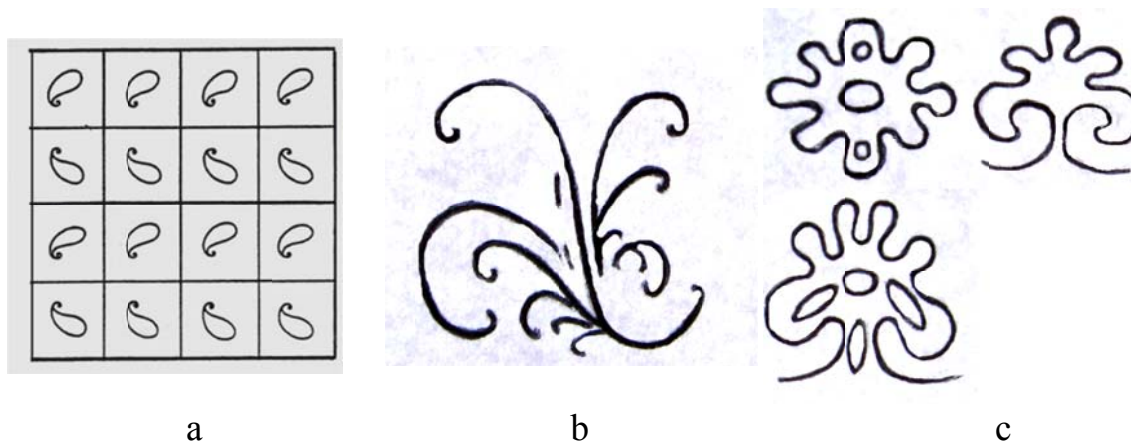
Figure 1 – The scheme of an arrangement of a pattern on the cloths (a) stylized grapevine (b) and a lily (c)

For filling of a background, imitation of relief structure of fabric with way of the press, as additional background motive it was offered to apply one more of bright elements of Baroque style which is based on use of the vegetable ornament including flower motive – a flower of a lily – a symbol of three virtues: beliefs, hopes and mercies. The lily also represents a trinity of mind, soul and a body. This plant designates perfection and is the main "flower" symbol in heraldry (Figure 1, c). In the rapport scheme additional motive elements of the stylized lily were placed opposite to each other according to the scheme of creation of a crepe interlacing. The rapport of additional motive is seculars reflected 4 times (Figure 2, b). The art and composite solution of a sample of fabric is shown in Figure 2,c.

a	b	c
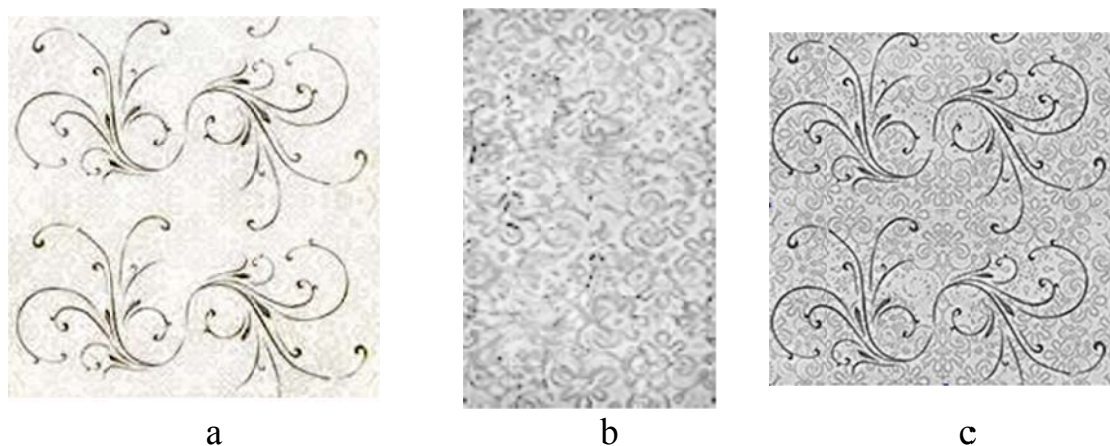
Figure 2 – Motive of a pattern of a woven cloth fabrics (a), motive of a background (b) and the art and composite solution of a sample fabric (c)

For a collection of fabrics the color scale actual for an inhabited interior of a spring and summer season in combination with the main colors of an era of Baroque is offered: beige, red, blue, green, brown colors. Beige and brown colors cause tranquility and reliability. Shades of the red allow receiving a charge of cheerfulness and activity. Blue color helps to relax and stimulates work of imagination. A main goal of green color is the preservation of wealth and prosperity, disposal of uneasiness and disorders.

The developed fabric is called "Lily" also this flower is the additional motive at fabric design which took in it the main lines of Baroque style. The art and composite solution of woven cloth fabrics were introduced in educational process of EI "VSTU".

372.881.111.1

ENGLISH VARIATIONS FOR EDUCATIONAL PURPOSES

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In this article we'll look at the pedagogical implications of using English as an International Language (EIL) as a model for language education in diverse ways. We'll discuss the importance of recognising the pluricentricity of English and the equal treatment given to all varieties of English and its speakers.

We'll describe a model of language variation that helps us to place different ways in which language varies in relation to each other. The aim of developing this model is to give a broad understanding of how various Englishes relate to each other and how different ways of learning them can be seen as additional approaches to studying language variation. In doing so, we will also suggest that the definition of EIL needs to be expanded to look at all the domains specified in a global approach to language variation, rather than placing different types of Englishes in separate positions. We will then conclude the article by briefly discussing how these variations relate to educational contexts.

Thanks to globalisation, it is widely agreed that the sociolinguistic reality of the English language has become far more complex than those of other languages in the world today. It has become the dominant language in a variety of economic and cultural arenas such as the language of international organisations, of the cinema and popular music, of publications, of international travel, and of education. In fact, it is the 'non-English-mother tongue' countries that have been significantly active in using English, and that have increased its value in each of the spheres. And, taken together, these international roles or functions of English have given the language the status of an international one.

The changing status and role of the English language in these countries have also suggested changes to the backgrounds of the users of English. Today's users of

English are mainly bi-/multilingual. They are fluent in English and in other languages, and they develop and use English in plurilingual contexts.

Another thing that linguists have noted is that there is no single 'standard' English. Native speakers of English show a lot of language variation. As a result of this, grammar books that are based on the 'native' speakers are not always accurate in their description of English. For example, while many grammar books say that we shouldn't split infinitives, i.e., we shouldn't insert an adverb in between a word group such as 'to conclude', there is plenty of evidence that people do so quite frequently. If we look at how language is actually used, we will note that this rule cannot be supported by actual language data. We often come across constructions such as: 'to quickly conclude' and 'to finally conclude'. In the just cited examples, the to-infinitives are broken up by an insertion of an adverb. Grammar books prohibit this; however, users of the language still do it. This shows that (native) speakers of a language show considerable variation and that grammar books that are used to describe the language do not always capture this variation. Thus, linguists go beyond the 'standard' models and look at how language is actually used by people from different backgrounds and in different contexts. These studies of language variation can help us in identifying factors that play a role in language variation and thus help us in developing a model for understanding language variation.

There are three key dimensions that need to be considered in modeling language variation: (1) users of Englishes, (2) uses of Englishes, and (3) modes of communication. They interact with each other in many ways.

Now let's have a look at an overview of how language variation can be modeled in a global context and therefore allows us to make a diagrammatic representation of these variations and study them systematically.

No	Domains	Example
1	Local, written, everyday	Friends writing letters to each other
2	Local, oral, everyday	Friends talking to each other about their plans for the holidays
3	Local, written, specialized	Texts written by and for a local group of doctors
4	Local, oral, specialized	Farmers discussing specifics about their crops
5	Global, written, everyday	International news agencies reporting on events
6	Global, oral, everyday	Conversations amongst people from different parts of the world
7	Global, written, specialized	Scholars writing research papers
8	Global, oral, specialized	Conference presentations

The presented framework helps us to see that the language variations are not just about 'nativeness' of a variety, but about the community that uses a specific variety. Each community negotiates its own linguistic norms. The norms are not static; they

change together with the change of the community membership. So, for instance, the language of a discipline does not remain constant, but changes with time: research papers in zoology today are not written in the same language as they were 100 years ago.

The changes in the language show the shift in the community membership over time as well as the development of the field. This implies that even in inner circle countries, not all students have access to the language of domains 7&8 – this is something that they have to develop through schooling. Without appropriate teaching of the global specialized discourses, students who only have a control of local varieties of English will have a difficult task in participating in a globally oriented knowledge community that fall in domain 7&8 of the framework. Thus, it is important to expose students to a range of language varieties and variations and to give them access to globalised norms of language use in specialized domains.

So, a broader understanding of language variation presented in the framework above suggests that local varieties may be used in educational contexts, but this should be done without replacing access to the global norms of the language. EIL pedagogy needs to recognize and be inclusive of different ways of using language across the different domains.

In conclusion, we'd like to draw attention to a broader pluricentric approach to language in pedagogical contexts. The present article has elaborated on what a pluricentric approach to language entails and recommends that language teaching should be grounded in such an understanding of language in order for it to meet the needs of learners in various contexts and who are learning English for different purposes.

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SOCIALLY CRITICAL TEACHING FOR MODERN SOCIETY DEVELOPMENT

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In this article we'd like to discuss some issues of education based on the principles and values of critical inquiry, social justice, democracy, care and respect. We believe that good teaching can engage students intellectually and socially by drawing on their interest, posing controversial problems, offering meaningful activities, and encouraging an active role in the society. It's called socially critical teaching. Unfortunately even the best educational institutions do not challenge students to think deeply, to question fundamental social premises, or to discuss real issues with one another. With this in mind, we want to do a number of things in this article. Firstly, to unsettle the taken-for-granted assumptions underpinning conventional educational practices and to explain why they are such a problem for students and teachers.

Secondly, we want to identify some of the key elements informing a socially critical pedagogy of teaching.

Despite decades of research, official inquiries, academic publications and high school reform efforts, students especially those from economically and socially adverse backgrounds are disengaging and switching off sstudying at alarming and unprecedented rates. We know that doing higher school can be an alienating experience – rigid rules and timetables, hierarchical structures, didactic teaching, punitive discipline, competitiveness, streaming, testing, poor relationships, irrelevant curriculum, and so on. We also know that learning is more likely in contexts where students feel valued, respected and trusted as young adults. Traditional transmission approach to teaching can be described in the following way: a) the teacher teaches and the students are taught; b) the teacher knows everything and the students know nothing; c) the teacher thinks and the students are thought about; d) the teacher talks and the students listen; e) the teacher disciplines and the students are disciplined; f) the teacher chooses and enforces his choice, and the students comply; g) the teacher acts and the students have the illusion of acting through the action of the teacher; h) the teacher chooses the program content, and the students adapt to it; i) the teacher confuses the authority of knowledge with his or her own professional authority, which she or he sets in opposition to the freedom of the students.

We believe it is possible to move beyond the limitations of transmission models of teaching in order to reconstruct a more humanizing pedagogy in modern world. In response to the inadequacy of traditional models of teaching we want to consider some ideas for an alternative socially critical pedagogy of teaching. This kind of critical teaching will help to produce a new generation of intellectuals for modern society development who: a) develop the ability to think critically and analytically, b) cultivate their intellects, c) understand the world as it is, in relation to what it could be, d) interpret and make sense of the world around them by understanding invisible forces at work in shaping particular situations, e) employ their creative ability to get beyond ritualized but failed practices in school and society, f) use their imagination to transcend the trap of traditional racial, gender, sexual, and class-based stereotypes and the harm they can cause in their individual lives and in the larger society, g) reconceptualize the role of 'good citizen' in a way that speaks and acts in relation to dominant power and the ways it oppresses those around them, h) develop the ability to teach themselves what they need to know to take on a particular task, i) cultivate a humility that allows them to be both good leaders and good members of diverse learning communities, j) devote themselves to never-ending, life-long growth as citizens, parents, workers, and researchers.

We believe that good teaching is happening whenever students are involved with issues they regard as vital concerns, with explanations of human differences, with applying ideals such as fairness, equity, or justice to their world; whenever students are being helped to see major concepts, big ideas, and general principles and are not merely engaged in the pursuit of isolated facts; whenever students are involved in planning what they will be doing, in a real-life experience; whenever students are asked to think about an idea in a way that questions common sense or a widely

accepted assumption, that relates new ideas to ones learned previously, or that applies an idea to the problems of living; whenever students are involved in re-doing, polishing, or perfecting their work; whenever students are involved in reflecting on their own lives and how they have come to believe and feel as they do.

By way of summary, socially critical teachers are aware of the importance of building relationships founded on trust, respect and care and also inducting students into the process of relating to bigger and more important social ideas, issues and questions. Socially critical teachers connect local community questions, issues and problems to broader global environmental, financial and social concerns, such as climate change, water scarcity, poverty and trade. They appreciate that all students are capable of learning with the appropriate cultural, pedagogical and organizational settings, show a willingness to listen to what students have to say about their life worlds and a preparedness to share power and negotiate the curriculum including more flexible forms of assessment. Socially critical teachers adopt critical literacy strategies to provide students with the capabilities to read, to interpret, and to understand how meaning is made and derived from print, photographs, and other electronic visuals. They use inquiry based and interdisciplinary research methods to identify problems, describe them, and develop action plans including interviews, photography, writing, and videos to develop an integrative, emergent, and authentic curriculum, tap into youth popular culture such as fashion, music, television and movies to probe the cultural complexity of daily life and the ways in which it either limits or enables understandings and actions of young people in society. Socially critical teachers move beyond traditional service-learning pedagogies to promote critical service-learning activities where students reflect upon the forces and structures responsible for injustice, work collectively and teach others about the effects of unemployment, work, technology, consumerism, sexism, racism, poverty, child-labour and so on. They are aware of the potential of youth participatory action research to provide young people with opportunities to explore social problems affecting their lives and then determine social actions to remedy these problems, utilize a wide range of arts based strategies including the performance arts, visual arts, music, poetry, and mixed media as a means of nurturing the imagination and teaching for social justice. Socially critical teachers adopt a problem-posing mindset by asking critical questions and embracing critically reflective practices. They are willing to challenge the beliefs, assumptions and values underpinning the everyday practice of teaching as well as envisaging social just alternatives.

So, in this article we set out to provide a critique of traditional transmission models of teaching with particular regard to the ways in which it leads to conformity, obedience and passivity among students and teachers alike. We argue that traditional transmission education leads to an emaciated view of teaching because of its narrowly conceived and instrumentalist focus on method, technique and content. As a consequence, the broader intellectual, contextual, moral and ethical purposes of teaching are glossed over.

In response, we have advanced an alternative socially critical pedagogy of teaching grounded in the values of critical inquiry, social justice, democracy, respect and care.

We hope that socially critical teaching practices will provide inspiration for ongoing dialogue among teachers in particular educational institutions and contexts.

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ENVIRONMENTAL EDUCATION: THEORETICAL AND METHODOLOGICAL ASPECTS

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Two main problems can be distinguished in the implementation of the environmental education. On the one hand, ecology is an interdisciplinary science. The core of the environmental problems is a variety of reasons which are manifested in different chemical or biological processes. Taking into consideration the diversity and complexity of these reasons, traditional educational approaches do not provide the answer to the questions, determine the symptoms or suggest the ways of avoiding the problem. The second problem lies in the methods of teaching environmental knowledge. "Obvious" environmental problems in the physical, chemical and biological forms are quite understandable with the help of natural science analysis - this analysis is conventional in the science education. The problem is that this knowledge is theoretical and does not develop practice-oriented competence. Practice-oriented approach in the environmental education is realized only when the natural science basics of the environmental issues in the context of professional activity are determined. Tailored to the above mentioned factors strategies are defined as rational knowledge, which is integrated into the content of curricula and programs. Environmental education in this sense is effective only when it is transferred by the teachers of HEI, SVI and secondary schools.

In recent years, several TEMPUS-projects which focus on environmental issues have received the support. Partners from Belarus, Russia and Ukraine were involved in the implementation of these projects. Most of these projects were focused either on the development of individual disciplines or on the issues that are at the point of intersection of ecology and economy. Target priority was to reform the curricula of higher education. However, none of the TEMPUS-projects covering environmental issues in the context of a multi-level educational system has been realized so far. In connection with the aforesaid, the project "Environmental Education for Belarus, Russia and Ukraine", being implemented in **vivo** "VSTU" has the following objectives:

1. to conduct the analysis of the existing curricula in the field of general and vocational education, identify weaknesses and shortcomings;

2. to identify practice-oriented goals and corresponding educational technologies at the seminars within the didactics of environmental education and relevant topics in the field of environmental protection;

3. to develop the overall concept of ecologically oriented advanced training courses and retraining programs for teachers of secondary and vocational oriented training institutions on the basis of the aforementioned tasks;

4. to facilitate the implementation of the practice-oriented ecological competence principles in the field of educational and vocational oriented training;

5. to facilitate the integration of the environmentally oriented educational content into a multi-level system of education of Belarus, Russia and Ukraine, thereby supporting activities for the protection of the environment in the partner countries.

In order to promote, the proposed advanced training courses will be developed as remote. Besides, the modernization of the curricula based on the environmentally oriented concept developed in the framework of seminars both from the methodological point of view and in terms of content has been planned. EI "VSTU" has the necessary competencies for the development of a modern approach to the analysis of the interaction between industry and environment. In particular, one of the research areas of the University - research and development of new processes and equipment of industrial ecology and energy saving. The main problems to be solved according to the above direction - the physicochemical and biological eco-friendly technologies for the processing of solid combustible minerals, processing and recycling of organic and inorganic waste, development of technology and equipment for processing industrial waste. The University has organized the Department of labor protection and industrial ecology. The university has a scientific school in the field of ecology, natural resources, resource conservation, environmental management and protection in the emergency situations; postgraduate studies in the specialty 03.25.13 "Geoecology".

Competence of the University in the field of the industrial ecology is confirmed by the participation in the projects of the State program of the scientific research "Construction and Architecture", the Belarusian Republican Fund for Fundamental Research, the presence of Technopark EI "VSTU." Currently, the work on the participation in the state scientific-technical program "Natural resources and environmental risks" in 2016-2020 is underway.

SOCIAL ACCOUNTING FOR BELARUSIAN INDUSTRY

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Modern economic conditions of economic activity exposed continuous development, with the entire set of positive and negative changes. One of the most pressing issues of our time is the socialization of business, introduction of ethical considerations and social responsibility to business practice. Certainly, business

structures are full participants in the social life of a particular region, country and society in a global sense, and their activities have a direct or indirect impact on the environment and society. Social responsibility is a multifaceted concept, there are a great number of author's approaches to the definition of its nature, varying in the specific objectives and coverage degree. One of the most common is the definition formulated in Standard ISO 26 000: Social responsibility is the responsibility of an organization for the impacts of its decisions and activities on society and the environment, through transparent and ethical behavior that: contributes to sustainable development, including health and the welfare of society; takes into account the expectations of stakeholders; is in compliance with applicable law and consistent with international norms of behavior; and is integrated throughout the organization and practiced in its relationships.

With the emergence of the idea of corporate social responsibility has become a topical issue of the creation of a reporting form, which would reflect the non-financial aspects of business activities. To date, the international practice has a number of international standards for nonfinancial reporting, known around the world, such as AA 1000, ISO 26000, SA 8000, GRI and a number of others. Most of them consider the responsibility from three sides: staff, society and environment. Some approaches detail the society into key stakeholders: business partners, government structures and local communities, including philanthropy and volunteerism. Each direction includes a number of indicators that collectively characterize the organization as a liability. Non-financial reporting standards are often criticized, because there's quite clearly traced marketing idea. Some companies declaring to be socially responsible seek only to consolidate their position in the market due to the growth of confidence from the part of stakeholders. There's still no single form of the report and method of determining the indicators, it's making possible to reflect positive aspects and hide some of the risks. Discussions about standardization and unification conducted are very relevant today.

The practice of social responsibility and accountability in Belarus began with the accession of Belarus to the UN Global Compact. In 2005, with support from UNDP the nomination "Socially Responsible Brand" was approved within the contest "Brand of the Year", where the companies began to submit their first social reports. Every year the Global Compact covers more and more participants, but enterprises of light industry are almost absent in the nomination. The problem is in a crisis of administrative values. Traditions, setting the basis for such companies, don't give a chance to develop and be open to innovations. But the concept of social responsibility in light industry has not lost its relevance, in this case feasibility study and integration of social efficiency in the combined effectiveness are important. Successful and effective implementation of the concept of corporate social responsibility in the Belarusian economy is heavily dependent on the monitoring, auditing and accounting system. To form a system of social reporting is necessary to amend the domestic accounting system, expand and complement it in terms of non-financial aspects. Social accounting is a system of observation, study and control of social activities of the economic entity. Goal is building complete and accurate information on the

results of the social policy of the organization. It's closely related to statistical, administrative, financial, environmental accounting types. Social accounting should present social factors in a form suitable for analysis. Methodological base is international standards of corporate social responsibility; methodological framework, which coincides with accounting; private recommendations (consultants and auditors offers); gained hands-on experience.

In order to construct an empirical base the accounting system adopted in the Belarusian light industry organization was analyzed. Given the study of foreign experience and domestic practice, standard GRI was put in basis of the social report. Research is conducted in the following directions: economic; environmental and the social aspects, which include subsections: the organization of labor and decent work; human rights; society and product responsibility. Each area contains a number of indicators. Some of them can be obtained from various forms of statements contained in the national accounting system: accounting balance, forms for labor (6-t (personnel), 6-t (profession)); investment and expenses (4-f (invest), 4-f (costs)); ecological passport of the enterprise, organizational and business plans, collective agreement, etc. But the vast majority of information can only be obtained by examining operational records of departments: personnel, marketing, planning and economic, trade unions, the legal department and others. Such technique can be used as a basis but has several disadvantages. A number of GRI indicators, reflecting the direction of social activity, have no use in the domestic environment.

According to the survey the following recommendations can be offered for the development of the social accountability:

1) a company must have a person responsible for collecting information and formation of a social report. His/her duties can also include calculation of social efficiency, economic feasibility of social measures (HR-manager). Invited to send personnel officer or a marketer to the courses of training and retraining;

2) the system of social account must be synchronized with accepted accounting and reporting forms. A number of objects of social accounting are exclusive and have a specific nature, which explains its necessity as an independent type of account;

3) social reporting should be based on international standards of non-financial reporting, which makes a social report valuable in terms of international cooperation;

4) social indicators which can't be calculated due to lack of information or practice should be replaced by similar activities. Otherwise, the index value should be zero - "no";

5) the report must be designed in a standard format, easy for understanding and assessment, freely available (Internet, publication in mass media, and other media);

6) social accounting must be continuous, and social reporting - periodic, and issued within the stated periodicity (for example once a year).

This will allow the organization to declare itself as a socially responsible. In addition to the ethical and moral advantages, of course, social reporting is an effective marketing tool. Increased confidence on the part of customers, suppliers, government agencies, foreign partners will bring a significant commercial advantage, combined with the increase in economic efficiency. The social report will help to

make well-founded and effective management decisions in personnel policy and social activity. Measures to improve the social efficiency (in particular in relation to personnel) can be economically justified and integrated into the planning and forecasting. The experience of foreign countries should serve as a basis for the formation of own institution of social responsibility and accountability. We can't exclude the specific features of the Belarusian economy, as related to the historical, geopolitical factor, and with the mentality of the Belarusian society. Consolidation of international experience and specific features of the domestic economy will help build a system of social reporting, adequately reflecting the social activity, synchronized with the international practice of social responsibility, which will bring a number benefits for organization in the short and long term.

LANGUAGE ACQUISITION VS LANGUAGE LEARNING

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According to linguists there is an important distinction between language acquisition and language learning. Children acquire their mother tongue through interaction with their parents and the environment that surrounds them. Their need to communicate paves the way for language acquisition to take place. As experts suggest, there is an innate capacity in every human being to acquire language.

By the time a child is five years old, s/he can express ideas clearly and almost perfectly from the point of view of language and grammar. Although parents never sit with children to explain to them the workings of the language, their utterances show a superb command of intricate rules and patterns that would drive an adult crazy if s/he tried to memorize them and use them accurately. This suggests that it is through exposure to the language and meaningful communication that a first language is acquired, without the need of systematic studies of any kind. When it comes to second language learning in children, you will notice that this happens almost identically to their first language acquisition. And even teachers focus more on the communicative aspect of the language rather than on just rules and patterns for the children to repeat and memorize. In order to acquire language, the learner needs a source of natural communication.

The emphasis is on the text of the communication and not on the form. Young students who are in the process of acquiring a second language get plenty of "on the job" practice. They readily acquire the language to communicate with classmates. We can see this tendency in which second language teachers are quite aware of the importance of communication in young learners and their inability to memorize rules consciously (although they will definitely acquire them through a hands-on approach just as they did with their mother tongue).

Adults, in contrast, when trying to learn a second language, are usually presented with a myriad of grammar rules and patterns to master from the very first class. In almost all cases, courses revolve around grammar, patterns, repetitions, drillings and rote memorization without even a human interlocutor to interact with. The very same courses that promise you language independence and the ability to communicate upon completion of the courses do not offer you a single chance to engage in meaningful conversations. How could you be expected to communicate if you are never given the chance to speak with a real person? Language without real communication is useless.

It is said by advocates of these procedures, that their cognitive development cannot be equalled to that of a child and that statement is very true indeed. However, the fact that there are important cognitive and developmental differences between children and adults does not by any means imply that language should be presented devoid of any meaning as a rigid set of rules and patterns which are essential to master. Advocates of this school have the perception that every single piece of the puzzle they teach (i.e. a certain pattern, rule, tense, etc) is going to be inserted into the big picture one day and the puzzle will be perfectly complete for the student to see and use. In reality, students simply receive piece after piece after piece of a big something that they are never able to tell what it is or when they will be able to see it, if ever.

Have you ever tried to make a really big puzzle without an overall picture of what it would look like when finished? If you have, you will have noticed that it may be a very frustrating and draining activity, with no clear goals and objectives. Every effort you make seems to be meaningless and you usually feel like drifting around aimlessly and purposelessly. Isn't it part and parcel of the Second language teaching profession to find thousands of adult learners who could recite a grammar book by heart but nevertheless are unable to communicate basic ideas naturally and fluently if it is that they can communicate them at all?

This, of course, does not have any resemblance to the way in which a first language is acquired. Nor does it mean that children and adults acquire a first and a second language in precisely the same way. There are obvious differences among children and adults learning a second language.

However, a quick look at present-day language courses clearly shows that this is not the case at all. You will see from the very first lesson, that the students have laundry lists of words to master and memorize, grammar, vocabulary, grammar and more vocabulary to make them feel they can even "touch" the language, those pretty "tangible" patterns they learn lesson after lesson that make them feel so secure and confident. The truth is, in the vast majority of cases, that whenever presented with a real situation in which they have to use the language, more often than not they dry up and are unable to utter two coherent phrases altogether. They cannot be expected to produce something different, something communicative if what they are trained to do exclusively is grammar, repetitions and drills, The magic "click" that is supposed to take place in the students' brains after constant hammering and repetition apparently never takes place or if it does, in the best of cases, it is in less than 2 per cent of the learners. They can fill in the blanks on a grammar page. Research has shown,

however, that knowing grammar rules does not necessarily result in good speaking or writing. A student who has memorized the rules of the language may be able to succeed on a standardized test of English language but may not be able to speak or write correctly.

Language learning as seen today is not communicative. It is the result of direct instruction in the rules of language. And it certainly is not an age-appropriate activity for your young learners - as it is not for adults either. In language learning, students have conscious knowledge of the new language and can talk about that knowledge.

Pragmatic results clearly show that a grammar based approach to teaching a language is highly ineffective since language per definition entails communication. Until we come to understand this simple fact, we will keep seeing students dropping out of their language studies because "they are too hard for them, they are not cut out to learn a second language" and statements like these. And they may be true... They do not need to learn a second language. Then need to acquire it in all the senses of the word.

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THE METHOD INDICATING AN INTEGRAL LEVEL OF STAFF APPRAISAL

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At present the labour potential of any organization is a key factor for producing competitive goods and providing quality services.

As a rule the basic elements of the labour potential are not only the structure of labour resources, the system of formation, training and staff development, stimulation of labour activity and maintenance of workers at the company but also staff assessment (competence, the ability to organize and plan work clearly, responsibility, independence, initiative, ability to master and use new methods at work, capacity for work, ability to maintain relationships with other workers, etc.).

In this regard, personal evaluation should be taken into account, especially quantitative and qualitative factors such as vocational qualification level, professional qualities and the complexity of the functions; indexes of works, and also their rhythm.

The estimated coefficient of vocational qualification level is suggested to determine by using the formula of $K_{пкv} = $ (Оo+of Os+of Опм) $: \sum 0_{мах}$: where 0o- is an estimation of education; Os- is evaluation of work experience; Опм- is the level of active participation in the system of improvement of professional skills; $\sum 0_{мах} = 2$ - is the maximum amount of points in the evaluation of three groups of signs, Table 1.

Table 1 − Assessment of the vocational qualification level of the staff

Signs of assessment	Estimation in points
Staff education	
1. With secondary education (complete or incomplete)	0,15
2. With a special vocational education	0,25
3. With a secondary special education	0,35
4. With a higher and incomplete higher education	0,50
5. With two higher educations relevant to the job profile, or degree	0,75
Employee participation on improvement of professional skills	
1. Short-term courses, internship at the company, target courses	0,25
2. A second profession (specialty), confirmed by the certificate	0,45
3. Refresher courses (once in 5 years) receiving the certificate of completion of courses or training in College (another secondary institution)	0,55
4. Training in a higher educational institution	0,75
The evaluation of work experience personnel	
1. Up to 15 years for each year	0,03
2. 15 and more	0,50

Assessment of professional qualities of workers (taking into account the characteristics of enterprises of light and textile industry) can be the most versatile features that significantly affect individual productivity. Evaluation of the totality of business qualities summation estimates ofthe levels of attributes with regard to their specific significance. It is important to assess the difficulty of the job function. It is carried out on the grounds, included in tariff-qualification Handbook and reflected in the wage category.

Each feature has four levels of display and is estimated in points: low - 0,5; middle - 1; above average - 2; high - 3,0. Estimation from 0,5 to 3 points is given to the worker for each basis taking into account its specific significance, Table 2.

The integral assessment (Ки) of all totality of qualities is average summing estimates of the characteristics, multiplied by their relative importance according to the formula:

$$K_{\textit{и}} = \left(\sum_{i=1}^{n} a_{ij} \times x_i \right) : n$$, where i-is a sequence number of sign (i = 1, 2, ... n); п - is a

number of signs; j- is a level of any sign estimated (j - 1, 2, 3, 4); aij- is a j- th level of i - ro sign for the worker, the points; xi- is specific significance of the i - ro sign to evaluate the overall professional qualities, in fractions of a unit.

Table 2 − Characteristics of professional qualities, complexity of functions performed and the results of the workers.

Indexes	The specific value	Max. estimation (3points) taking into account the importance
Professional qualities of workers (Кд)		
1.Professional competence	0,21	0,63
2.Good organization of work (without reminders and enforcement)	0,19	0,57
3.A strong sense of responsibility	0,17	0,51
4. Ingenuity and initiative in the work	0,15	0,45
5. Good contact and the ability to work effectively	0,10	0,3
6. The propensity for new ideas and creative solutions	0,09	0,27
7. Emotional exposure	0,09	0,27
The complex functions (Кс)		
1. The nature of the work reflected in the tariff-qualification Handbook	0,50	1,50
2.The variety of work	0,20	0,60
3. The guide element (team)	0,20	0,60
4. Additional responsibility in the process and working with self-control	0,10	0,3 0
Quantitative indicators of the results of the workers (Ккал)		
1.Volume of work	0,60	1,80
2. The quality of work performed	0,25	0,75
3.Rhythm	0,15	0,45

Overall assessment of work is determined taking into account the qualitative and quantitative indicators according to the formula Кобщ = 0, 5 (Ккач. + Ккол.), where

$$Ккач = (Кпку + Кд + Кс) : 3.$$

Based on the value of this integral index we have concluded the employment potential of both an individual worker and team working. The higher this ratio is the better use of the labour potential. The proposed method of assessment provides a comprehensive assessment of employment potential, helps to express its state of the integral indicator, allows to reduce time spent on assessment and leads diverse indicators to a single dimension, but also highlights the status levels of the labour potential of the organization.

UDC 331

UNEMPLOYMENT AND ITS FEATURES IN BELARUS

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The main feature of the Belarusian labour market is an extremely low official unemployment rate (0.5% in 2013.). This has deep social sense, since the low unemployment level is always perceived as a characteristic of the social welfare of the community, enhances social guarantees of employment and instills confidence in the future. However, Belarus faces the gap between actual unemployment and its official figures. This difference is primarily seen by the state employment service. Considering that the average period of unemployment in Belarus lasts 3.1 months, the unemployment rate can be calculated not by the number of unemployed registered in the state employment service by the end of the year, but by the number of unemployed recognized during the year. This figure more accurately reflects the full scope of work of the state employment services with unemployed during a year and, as seen in Figure 1, it is more than 6 times as high as the level that has remained by the end of the reporting period - for example, in 2012 it amounted to 4 % during the year and 0.6% by the end of the year.
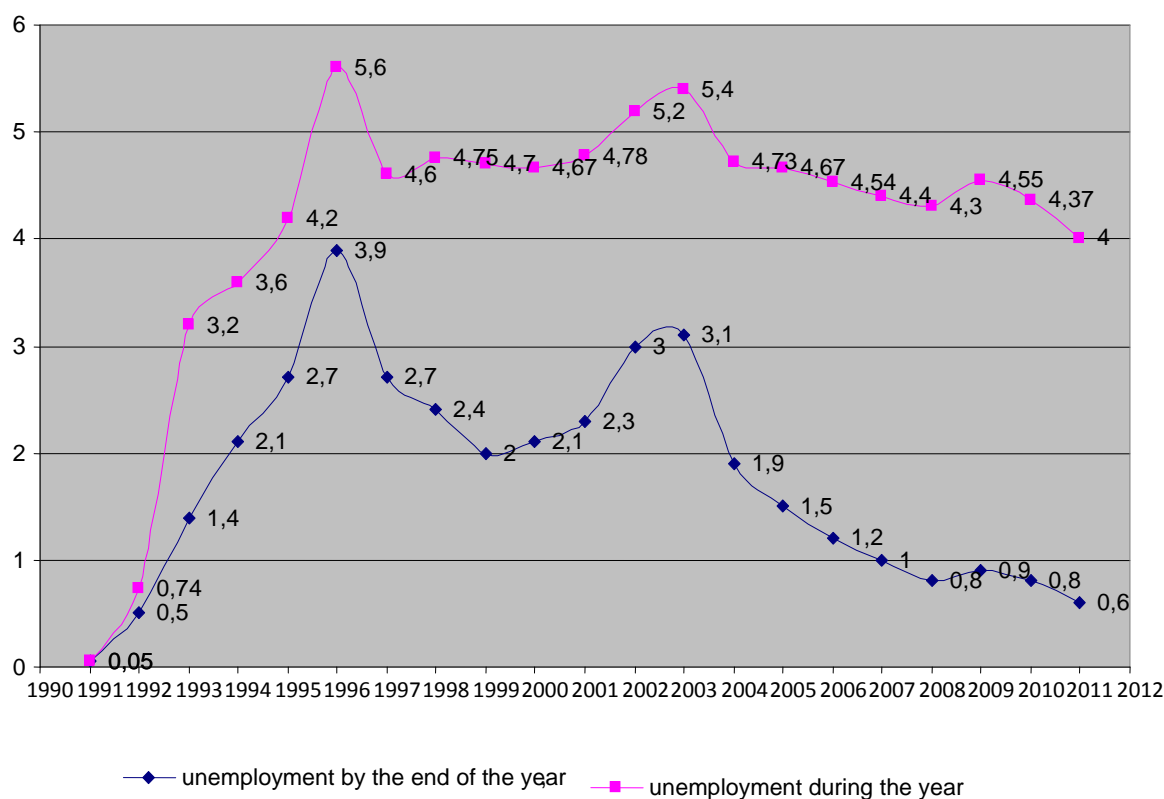

Figure 1 − Unemployment level in the Republic of Belarus, %

In 2013 in the structure of the official unemployment the proportion of women was 40.6% in Belarus. The proportion of women is reduced, which exacerbates unemployment among men. In the overall composition of the unemployed in 2013, 19.25% were young people aged 16-25 years. Acuity of youth and long-term unemployment has been considerably reduced in Belarus in recent years. Average duration of unemployment was 3.1 months in 2013 (cf. average duration of unemployment was 6.4 months in 2000).

In 2009 unemployment was estimated 6.1% according to the census of the Republic of Belarus. The labour force survey is an internationally accepted tool for determining the actual unemployment rate, according to which individuals belong to the unemployed if they are eligible to ILO criteria. In 2012 such research on an ongoing basis started in Belarus.

According to a sample survey of households conducted by the National Statistical Committee of the Republic of Belarus in February 2012 the unemployment rate was 5.4%. Since this index is calculated according to ILO methodology, its use is the most correct when making international comparisons.

Table − Socio-demographic characteristics of the Belarusian unemployment

Years	Proportion of women in the number of unemployed, %	Proportion of youth aged under 25 in the number of unemployed, %	Proportion of long-term unemployed (over 1 year) in the number of unemployed, %	Average duration of unemployment, months
1991	80.0	data n/a	3.8 (1993)	data n/a
1995	64.3	34.7	15.7	data n/a
2000	60.7	40.9	12.6	6.4
2005	68.9	36.8	11.7	5.8
2006	66.0	29.0	10.5	5.1
2007	65.6	26.9	10.3	4.9
2008	60.7	26.3	8.2	4.4
2009	57.0	27.3	6.2	4.0
2010	52.6	24.1	6.4	3.9
2011	54.1	24.1	5.8	3.7
2012	48.0	22.9	5.9	3.5
2013	40.6	19.2	4.6	3.1

Reference: [1, p. 154, 161, 166; 2, p. 222, 236, 248].

While characterizing the unemployment in Belarus it should be noted that the main reserve of its growth can be individual state enterprises, which retain a significant number of inefficient jobs in economic terms (i.e. low productivity, low wages, poor working conditions). This generates excessive state's demand for labour, which is supported by a rigid employment protection legislation [3]. In the context of

economic restructuring such jobs should be eliminated. Their retention significantly increases the social efficiency of employment as it protects employees from layoffs, but leads to low economic efficiency of employment and slows down structural transformation of the economy.

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FACTOR ANALYSIS OF ECONOMIC INFORMATION

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In the transition to work in market conditions Belarusian enterprises were in the hard conditions of internal and external competition, which required active measures aimed at optimizing processes and economic strategy. Subsequent optimization of the company achieved the adoption of correct management decisions that require a comprehensive analysis of the results of the enterprise. Each productive indicator depends on many different factors. The more detailed studies the influence of factors on the effective index, the better the results of the analysis and evaluation of the performance of enterprises. Hence an important methodological issue in the analysis of economic activity is a deep and comprehensive study and measurement of the impact of factors on the study of economic indicators. Without such an analysis can not make informed conclusions on performance, identify production reserves to justify plans and management decisions.

The purpose of research - to construct factor model and predict the main activities of one of their light industry enterprises of Vitebsk.

The object of study - indicators of economic activity of the enterprise.

Research methods - grouping, modeling of economic indicators, the principal component analysis, factor analysis.

Research tools - Integrated System (IS) Statistica.

Relevance of the work lies in the fact that the solution of the problem is the nature of the application.

The economic activity of the company was assessed by indicators such as cost (X7), revenue from sales of products (X11), net income (X5), sales volume (X13), the value of fixed assets (X2), the cost of working capital (X10), payable (X6), price per unit (X1), non-production costs (X3), the shift index of equipment (X4), return on assets (X8). During the research task was to identify the relationship and the direct and indirect effects of these parameters on the profitability of the enterprise (Y).

Used during the factor analysis, principal component will reduce the dimension of the space of independent variables 14 to 6 indicators, moving from a one-parameter correlated to the independent factors. Means of factor analysis were identified such factors determining the level of the analyzed indicators, as the cost (X7), revenue from sales of products (X11), net income (X5), sales volume (X13), the value of fixed assets (X2), the cost of working capital (X10) and the functional dependence between the profitability of production (Y) and highlighted factors estimated impact of changes in each factor on the change of the analyzed indicators - profitability.

Rotated loading matrix is shown in Figure 1.

Variable	Factor Loadings (Varimax normalized) Extraction: Principal components (Marked loadings are >,700000)	
	Factor 1	**Factor 2**
x2	0,195191	0,260983
x5	0,926508	-0,008777
x7	-0,061367	0,897641
x10	0,590724	0,030854
x11	0,294689	-0,841305
x13	-0,744454	0,182278
y	0,683640	0,630940
Expl.Var	2,357654	2,014007
Prp.Totl	0,336808	0,287715

Figure 1 − Turn the matrix of loadings

These factor loadings should be understood as the correlation coefficients between the variables and factors. Thus, the variables X13 (revenues from sales) and X5 (net profit) most strongly correlated with factor 1, namely the value of the correlation is -0.74 and 0.926, respectively, variables X11 (sales volume) and X7 (cost) correlated with the factor 2 (-0.841, 0.897). In most cases, the inclusion of a separate variable in one factor, carried out on the basis of the correlation coefficients is straightforward. May also be variables that can not be loaded from any selected factors.

Thus, the first main factor (2.36 or 33.68 in terms of% of the total variance), directly related to the X5 and back with X13, can be defined as the net profit and sales revenue.

The second factor (2,014 in the level or 28.77% of the total variance), and directly related to the X7 and back with X11, can be defined as cost and volume of sales.

On the basis of the factor matrix (Figure 1) can be constructed in a number of models of normalized values.

For example, depending on the profitability of production model (Y) of the main factors f1 and f2 is:

$$Ynorm = 0,6836 * f1 + 0,6309 * f2.$$

Natural value Ynat profitability can be calculated by the formula

$$Ynat = Ysr + Ynorm * S \{Y\}, \text{ where}$$

Ysr - average profitability of production;

S {Y} - standard deviation of profitability.

In use, certainly more convenient regression models in the natural values of the signs, but factor analysis allows to define more precisely the closeness of the relationship between the factors and their influence on the main index.

Thus, factor analysis allows you to organize data to describe the relationship, to obtain additional material for testing intuitive considerations of manager or researcher.

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TEMPORARY EMPLOYMENT: MAIN DEFINITIONS AND SCALES IN BELARUS

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Globalization, intense competition, technological and structural changes, new work processes have led to profound changes in the organization of work, particularly in the labour market, giving rise to an increasing variety of non-standard work arrangements.

The main characteristics of traditional employment are the following: employment for an indefinite duration, fixed number of working hours (per month, week, or day), definite job with definite remuneration.

Non-standard employment differs in one or more aspects, i.e: based on a fixed-term labour contract; part-time instead of full-time; outside of labour relations and based on civil law; based on new ideas such as working at home, outwork and teleworking; based on a distribution of working hours that is adopted to the needs of the employer [1].

The multidimensional nature of atypical employment makes it notoriously difficult to define. ILO (International Labour Organization) defines atypical employment as employment that differs from the usual one and, in most cases, has been concluded with a contract and strongly protected by social rights.

Thus, **non-standard employment** is labor relations that deviate from the standard model of full, open and regulated employment with one employer, for a long period, in one or more criteria: hours of work, wage conditions, employment relationship duration, location of workplace, social security, etc.

Non-standard forms of employment can be classified as follows:

1. Working time flexibility: part-time employment; underemployment; overemployment.

2. Workplace flexibility: teleworking; self-employment (freelance).

3. Number of employee's flexibility: temporary agency work; temporary employment.

4. Labor relations flexibility: secondary employment; casual employment; temporary employment; self-employment.

One of the most prevalent non-standard forms of employment is **temporary employment**.

OECD identifies the following types of temporary employment:

• fixed-term contracts;

• temporary-work-agency employment;

• contracts for services;

• casual;

• daily workers [2].

In recent decades, the rapid growth of temporary employment was recorded in many countries around the world (Figure 1).
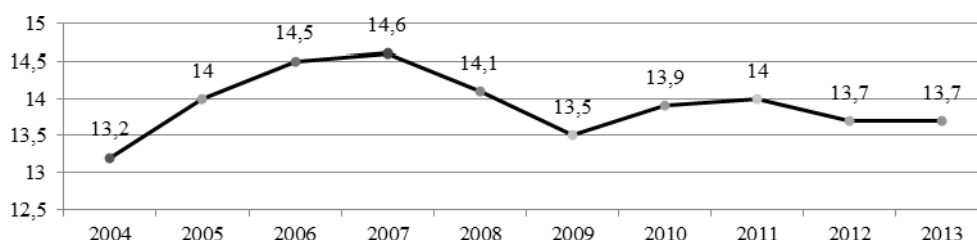

Figure 1 − Dynamics of temporary employment in the EU-28,% of total employment*

* Composed by the author according to the Eurostat database (Access: http://epp.eurostat.ec.europa.eu/portal/ page / portal / statistics / search_database).

The determined kinds of temporary employment are specific for each country and independently presented in national statistics. The national statistics of Belarus determines the following groups of temporary workers: with a civil contract; with an oral contract; with a fixed-term contract.

One of the features of temporary employment in Belarus is much bigger share of employment based on fixed-term contract than in the EU. According to the results of

the household survey of 2012, in Belarus fixed-term employment amounted to 82.8% of total employment (Figure 2).
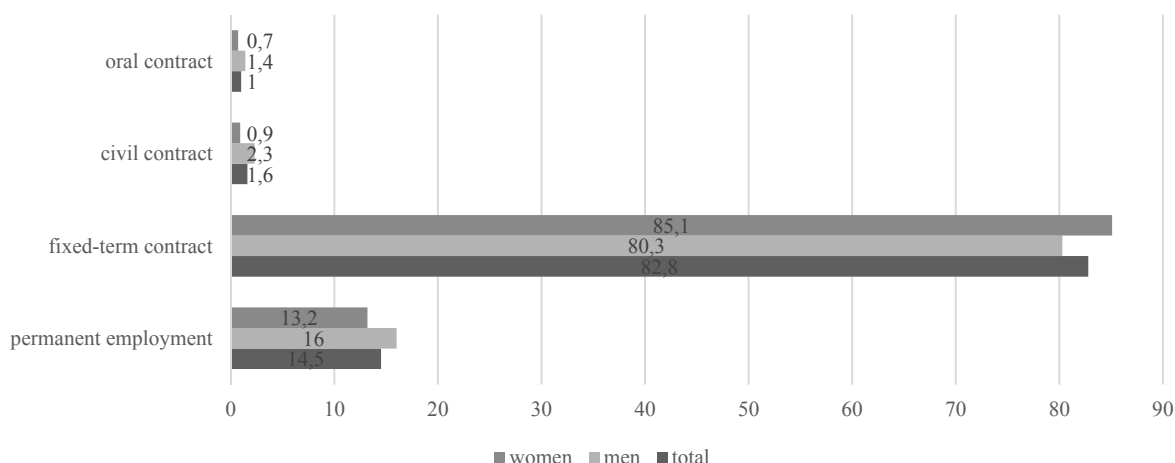

Figure 2 − Temporary and permanent employment in Belarus, % of total employment*

* Composed by the author.

In our opinion, the line between temporary and permanent employment is blurred. In Belarus, a fixed-term contract can be a rather long (over a year) period and then extended. Accordingly, employees may consider this work as a permanent, although it is not from a formal point of view.

World experience indicates that non-standard employment is beginning to dominate over standard employment. Therefore, it is necessary to fight not with non-standard forms of employment, that for a substantial portion of workers are voluntary and attractive, but with the negative consequences of their introduction, social and legal insecurity of workers. It is necessary to create and maintain attractive jobs and make them more competitive than unstable and informal.

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