PRODUCTION RESERVES

OPTIMIZATION OF DESIGN AND TECHNOLOGICAL PARAMETERS OF THE ROTARY BODY FOR INTER-ROW CULTIVATION

page 3–7

This article is devoted to research of indicator dependence of inter-row cultivation quality on parameters of improved design rotary working body. Analysis of the results of known theoretical and experimental research has been conducted. Aims and objectives of following research were formulated. Kinematic analysis and derivation of graph-analytic dependencies of throw out of soil under the influence of the rotary working body with a vertical axis of rotation were conducted. The theoretical results are verified by the means of experiments. The regression analysis of the results of experiments allowed to establish optimal parameters of axis angle of the rotor and its angular velocity. Well-grounded parameters provide the minimum content of erosion-prone soil particles and a minor deviation from the horizontal surface profile.

Keywords: rotary body, discarding the soil particles, the angle to the vertical axis, the angular velocity, optimization of parameters.

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SINGLE THEORY OF MOVERS ON THE CONTINUOUS FLOWS. SHORT THEORY OF CONCURRENT-ROTATING PROPELLERS

page 8–15

Concurrent-rotating propellers have second rotor wheel with higher productiveness compared to the first one, so the water-gas stream is injected (absorbed) through the channels between the blades of the first rotor wheel, which in this mode does not compress the water-gas flow, and functions as rotating guiding device only, which helps to obtain the sinusoidal characteristics of the axial velocity changes with providing zero acceleration of the water-gas flow at the input edges of the second rotor wheel blades which compresses the flow and produces thrust. Injection (absorption) of the water-gas flow through the channels between the blades of the first rotor wheel also promotes the swirling of the water-gas flow in the area B_1-H and emergence of additional static pressures gradient, grad P_d, that pulls the flow into the bundle before and after the section B_1-B_1, while before the section B_1-B_1 this additional gradient of static pressure facilitates further acceleration, and in a B_1-B_2 section slows down the water-gas flow, providing its sinusoidal characteristics in the H-B_2 section. Thus, the sinusoidal characteristics of the change of the axial velocity of the water-gas flow in the H-B_2 section helps to eliminate the kinematic zone of rigid (elastic) impact in the section B_2-B_2, which enables to increase the turnover, and therefore the thrust of the second rotor wheel of the concurrent-rotating propellers at 200—300 % compared to the turnover and thrust of the one-row propellers.

Keywords: kinematic analysis, concurrent-rotating propellers, blown profile thrust and lifting capacity.

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CAVITATION RESISTANCE OF VACUUM-ARC COVERINGS DEPOSITED ON SUBSTRATE OF DIFFERENT ORIENTATION

page 15–18

Here we set forth the results of measuring the cavitation resistance of coverings, rigidly fixed abrasive particles of vacuum-arc coverings, obtained from the erosion plasma of titanic and zirconium cathodes on the substrates with different orientation of their surfaces relative to the surfaces of cathodes. The cavitation area was developed under the end surface of the radiator of the exponential profile, connected to the ultrasonic wave generator. The oscillation amplitude of the concentrator end surface makes up 30 ± 2 micrometers, the oscillation frequency amounts to 20 kilohertz. The erosion of the samples was measured by means of the gravimetric method. The weight loss measurement accuracy is ± 0,015 mg. The experimental data was used to build kinetic curves of material destruction of the samples. The abrasive wear was measured in accordance with the plane-disc scheme. The coverings were tested by laying them on the plane surface, while the disc was made of materials with rigidly fixed abrasive particles. The rotation speed of the disc surface, contacting with a covering, is 4,38 m/s, and the sample load against the covering equates to 2,2 H. The mass losses of the covering within a certain interim were measured as well. The micro hardness of the samples was measured with the help of the Micro Hardness Tester-3. The research results have shown, that the cavitation resistance, micro hardness, abrasive resistance of titanic, zirconium and Ti-Zr system coverings, depend nonlinearly on the value of the angle between the substrate and the cathode surface. The formation of the Ti-Zr system coverings ensures the expansion of the area with identical covering properties. The area gets smaller by augmenting the vacuum chamber pressure.

Keywords: vacuum-arc coverings, titan, zirconium, resistance, cavitation, abrasive wear.

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THE COLOR CHARACTERISTICS OF COMPONENTS OF VEGETABLE SEMI-FINISHED PRODUCT BEFORE FREEZING

page 19–21

The color of products is an important feature of their trade look and competitiveness. Today, the instrumental methods of researches are recommended to carry out the quality assessment of products, as it allows to mark out different quantitative indexes.

The colorimetric method has helped to distinguish color parameters for the components of vegetable semi-finished products, used for the first and second courses, which are responsible for its formation. These products include table beet, carrot and sweet pepper, depending on the processing modes and methods before their freezing. There was determined the effect of drying and trunk operations on the color index, color tone, colorimetric purity of the main components of vegetable semi-finished products, used for the first and second courses.

It is noted that during the drying process the color tone of investigated samples changes with respect to the standard. However, compared to the effect of trunk process on the color shift, the tone is less significant. Moreover, it was found that the drying process helps to partially restore the color tone of the investigated samples of table beet, sweet pepper.

Keywords: colorimetric methods, drying, trunk, color index, colorimetric purity, color tone.

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REDOX FLOW BATTERIES — PERSPECTIVE MEANS OF ELECTROCHEMICAL ENERGY STORAGE

page 22–24

The article comprises the overview of redox flow battery (RFB) technology. The RFBs are best known as perspective means of electrochemical energy storage to supplement such renewable but unfortunately intermittent and poorly predictable sources of energy as wind and/or solar energy. The description of RFB concept as well as its application, advantages and shortcomings in comparison with traditional lithium-based batteries are provided. The current state of research on RFBs is discussed. The list of redox couples and electrode materials used in RFBs and their performance characteristics are presented. The prospects for RFB improvement and further development are suggested and as a result the direction of scientific experiments is outlined.

Keywords: energy storage, battery, electrolyte, electrode, catalytic activity, alloy.

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THE STRUCTURE OF SOLID ADSORBENT FOR ALTERNATIVE FUEL COMPOSITION

page 25–27

This article considers the production of new fuel composition using the new structure of adsorbent for the dehydration of ethanol. The main objectives of this study is to develop the adsorbent structure for the new fuel composition, being able to replace conventional gasoline in internal combustion engines, and thus capable of efficient regeneration for unlimited and multiple using; as well as to efficiently absorb water and thus almost not to be subjected to hydrolysis in order not to form the alkali which dissolves in ethanol and causes corrosion of the engine. The effectiveness of the new fuel composition has been tested in experimental internal combustion engine and then the energy efficiency of the new fuel composition has been determined which constitutes 75 % of the energy efficiency of conventional gasoline. The new adsorbent composition has been developed which is capable of regenerating while a slight heating in vacuum to its original state, and efficient dehydration of ethanol. On the basis of water-free ethanol by adding 15 % gasoline a new fuel composition has been created that can successfully replace conventional gasoline and significantly reduce the energy dependence of Ukraine on imports of conventional fuels.

Keywords: adsorbent, ethanol, gasoline, fuel composition, bioethanol, dehydration.

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INFLUENCE OF ALKALINE EARTH METAL OXIDES ON THE PROPERTIES OF FLUOR- AND BORON-FREE ENAMELS

page 28–31

These days, plenty of industries widely utilize various kinds of enamelware, which must comply with State Standards, look attractive, be safe and easy-to-use. However, the production of such ware requires the enamel, containing detrimental and unhealthy impurities of fluorine as well as boron. Yet, the compounds with these elements give enamel numerous positive qualities, including fusibility, viscosity of their melt and luster of the glass coating.

This article sets forth the results of analyzing the influence of alkaline earth oxides (CaO, MgO and SrO) on the fluorine- and boron-free coating enamel properties. It's been ascertained, that the mentioned oxides have positive influence on physicochemical enamel properties (i.e. chemical resistance and the temperature coefficient of linear expansion — TCLE), as well as optical characteristics of experimental enamel coatings.

The developed fluorine- and boron-free enamels can lower expenses for raw materials, preclude the lixiviation of boric oxide from enamel coatings and reduce industrial environment pollution with toxic substances (e. g. alkaline metaborates and fluorine compounds), which are emitted during the enamel melting process.

The new enamels can serve as the basic materials for colored fluorine- and boron-free enamels used for coating everyday household goods.

Keywords: enamel, coating, temperature coefficient of linear expansion — TCLE, chemical resistance, luster, bleach.

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DISTRIBUTION OF TRANSPORT MOBILITY OF CITY POPULATION BETWEEN INDIVIDUAL AND PUBLIC TRANSPORT

page 31–34

A number of recent studies shows that the organization and planning of urban public transport lies in accurate calculation or forecasting of the distribution between the individual and public transport.

Previously, it was believed that the potential movement is carried out by transport and on foot. But today it is necessary to define the coefficients of using transport and urban public transport, depending on a set of factors and different percentage of the major population groups.

This article has grouped the major impacts on the transportation mobility, according to foreign and domestic researches and obtained during the survey of urban residents. That would allow to take into account the effects of changes in the social, economic and technical indicators when determining the parameters of the transport system of the cities,.

As a result of these investigations, the data array was obtained which contains the transport using coefficients and public transport using coefficients for the researched cities. The revealed set of factors influencing the transport mobility allows overall estimation of the distribution of urban residents traveling either by the individual or public transport.

Keywords: mobility, population, public transport, questionnaire, survey, factor, function.

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THE RESEARCHING OF THE FACING STONE CUTTING WITH THE DIAMOND WIRE

page 34–39

The diamond wire cutting is still little-investigated despite the high level of the resource-saving and the popularity. This can be explained by the complication in experimenting with the quarry wire saw machines. There was paned the experiment with the stationary diamond wire machine. The developed method of testing allows repeat the experiment for the different types of the rock with the necessary number of cases. There was found out the dependence between the wrapping angle of the nature stone block with the diamond wire and the power parameters of cutting. Also there were found out the numerical value and the law of variation of the diamond cutting coefficient. It has significance for the theory of the diamond wire cutting. The assumption about dependence between power and force parameters of the dimension stone cutting with the diamond wire was confirmed with the results of the researching. The results have the correcting character for the basic foundation of the diamond wire cutting.

Keywords: diamond wire, diamond cutting coefficient, power-force parameters.

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ECONOMY OF ENTERPRISE

DETERMINATION OF FACTORS ON THE VOLUME OF VIOLATIONS IN A BUDGET INSTITUTION

page 40–43

A model of forecasting factors and factors of influence on the number of violations in a budget institution has been developed. It allows not only to determine the importance of each factor, but also to predict their impact. The factors taken for the model are: the volume of institutions' financing, wages, staff growth, the quantity of workers developed their skills' level. The scientific impact of this research is the ability to justify methodological approach to determine the effect of factors on the volume of violations in a budget institution, the mechanism of the relationship between factors and effective feature-based development of econometric regression models. However, as the direction of future research the need to adapt this developed econometric model for each of the budget institution is to be ouitlined.

Keywords: state financial control, budget institution, impact factors, budget violation.

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SOME ASPECTS OF DETERMINING THE EFFICIENCY OF TAX INCENTIVES FOR INNOVATION

page 43–47

The article considers the need to provide the tax incentives for innovation. The views of various authors on the definition of efficiency are presented. It was determined that during the tax incentives for innovation there are two sides, the state and enterprises which are engaged or will engage in innovative activities. However, the state has two interests, namely the interest of providing innovative activity suffering income losses of budget due to tax benefits and the interest of budget replenishment

than to maintain and improve the society needs, especially social. The formula are proposed to calculate the efficiency for the mentioned concerned parties and their interests accordingly. For each of the three mentioned indexes of the tax incentives efficiency it is proposed the positive change direction and the extent of normative values.

Keywords: tax incentives, tax deductions, efficiency, state interests, the interests of taxpayers.

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METHODS OF FACTOR EFFECTS DIAGNOSIS IN THE BUSINESS PROCESSES OF ALTERNATIVE ENERGY ENTERPRISES

page 48–50

The economic realities of the dominant ways of society development determine the ontogenesis of alternative energy companies, the successful activity of which depends on the effective management of business processes, with the indicator being modern methodological approaches to their diagnosis. Today, there are a lot of publications concerning this problem, but the diagnosis of factor effects underexplored.

The article presents theoretical and methodological approach to the evaluation of factor effect the first ever worked out in the context of management efficiency of the business processes at the alternative energy companies, which allows to identify the dominant internal and external components that affect the efficiency of the production and economic system.

This methodological approach is developed on the basis of the method of pair comparisons of multidimensional scale of T. Saaty. As a result, a matrix of pair comparisons was formulated and the primary number of factors of external and internal environment was interpreted, which allowed the administration of alternative energy companies to identify the dominant components of the effects in order to identify variables that ensure efficient operation of industrial and economic system in today's economic realities and make effective managerial decisions of the enterprise alternative energy.

Keywords: factor effects diagnosis, alternative energy company, «green» economy, business process.

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THE CURRENT ISSUES OF INTERNAL CONTROL AND INTERNAL AUDIT HARMONIZATION

page 51–53

The relevance of topics related to a harmonization of internal control and internal audit system of internal financial control is being proved. It is high lightened the essence of harmonization period by reviewing existing thoughts on this object, a concept of 'harmonization of internal control and internal audit», and provided reasonably practical recommendations to ensure such harmonization in the modern world. The scientific impact of this research is to clarify the concept of «harmonization of internal control and internal audit» as well as the development of practical recommendations to ensure proper harmonization of internal control and internal audit in the system of public internal financial control in Ukraine.

Keywords: internal control, internal audit, financial internal control.

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THE CHOICE OF RATIONAL NUMBER OF TRANSPORT VEHICLES IN VIEW OF THE MATERIAL FLOW PARAMETERS

page 53–55

The author stresses that in today's market conditions when determining the number and brand of transport vehicles it is necessary to consider the parameters of material flows.

Changing the material flow parameters throughout the year raises questions of the choice of the brand and the number of transport vehicles and the appropriateness of using their own and hired transport vehicles.

Changing of any parameter of material flow can lead to a change of transportation technology, and hence a change of the type and technical parameters of the vehicle for transportation. Out of the presented parameters of the material flow the conditions of transportation are considered. One of the transportation conditions is temperature control of cargo transportation. This parameter has a significant impact on the transportation of perishable goods.

Seasonal ambient temperature is very unstable and impossible to forecast in full; therefore, the transport company, even at a constant volume of material flow should be able to make variations in order to provide the flexibility and adaptability of its activities until the changes in temperature conditions of transportation.

The approaches to the formation of a rational number and brand of transport vehicles were considered. On the example of intercity transportation of perishable foods it was found that with constant material flow parameters the change in temperature, which is one of the conditions of transportation, affects: the transportation technological process, choice of the type of the transport vehicle (its technical parameters) and their number.

Keywords: seasonal changes of temperature, the parameters of the logistic flow, transport (car) park, hire.

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PREREQUISITES FOR FORMATION OF NEEDS OF ENTERPRISES FOR ENGINEERING SERVICES IN THE IMPLEMENTATION OF NEW TECHNOLOGIES

page 56–60

Increased competition, decreased demand for a number of industrial products in the domestic and global markets, increasing energy prices and other factors encourage domestic industries to develop and implement measures to improve their technical and technological base. However, the implementation of measures for introduction of new types of equipment and technologies often requires large amounts of research and design work that the company usually cannot to carry out themselves. One of the main ways for an enterprise to get external assistance in the development and (or) implementation of non-autonomous administrative decisions on the development and introduction of new technologies in modern business environment is the use of engineering. Existing methods for assessing the economic efficiency and justification for transition to new technologies of production do not sufficiently take into account the conditions of their development and implementation, including the possible need for involving engineering firms. The study showed that in some cases a company is better to create its own department

that would perform engineering works. The proposed measures allow to implement with due accuracy the evaluation of economic efficiency of such department, and the proposed method of evaluating the economic efficiency of engineering services for the development and implementation of new technologies of manufacturing allows you to set the conditions under which it is profitable to replace existing technology by the new, including the engineering services for the development and implementation of new technological processes.

Keywords: engineering, engineering services, technology, administrative decisions, economic efficiency, cash flow.

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