ABSTRACT AND REFERENCES
CONTROL PROCESSES

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PROCESS OF RESOURCES PROVISION MANAGEMENT OF THE ENTERPRISE'S ACTIVITY WITH CONSIDERATION OF GENDER FACTOR (p. 6-19)

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The study of the process of resources provision management of enterprise activity taking into account the gender factor was conducted. It was determined that the present environment requires business entities to take into account the gender factor when managing the resource portfolio of the enterprise. Investigation of the role of women in enterprise activity suggests that in most cases, the involvement of women in the enterprise activity usually comes with gender stereotypes.

The peculiarities of the influence of gender aspects on resource provision of the enterprise activity were investigated. It was determined that for each economic entity, there are individual resource combinations that form resource asymmetry and increase the level of competitiveness of the enterprise. It is determined that the reasons of the increase of gender asymmetry are caused by the following factors: the development of society (demographic, technological, socio-economic); gender (discriminatory factor), behavioral. Identification of components of the resource portfolio, taking into account the existing influence of the gender factor on the efficiency of business processes was conducted. The fundamental novelty in the systematization of elements of resource provision of the enterprise's activity is obtaining a set of weight coefficients, which allows evaluating the efficiency of the functioning of enterprises on the basis and taking into account the differentiation of components of the resource portfolio.

The expediency of using the method of solving the target task of managing resources provision activities of enterprises of the brewing industry is substantiated by determining the dependence of the indicator of enterprise efficiency on the volume of investment in private resources. It was proposed to construct a decision matrix using the comparative approach and the determined coefficients of the importance of the resource tree elements for assessing the effectiveness of the results of the resource provision of the enterprises of the brewing industry.

Keywords: resource provision management processes, gender, enterprise resource portfolio, resource asymmetry, heterogeneity.

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DEVELOPMENT OF THE FUNCTIONAL MODEL TO CONTROL THE LEVELS OF ELECTRICITY CONSUMPTION BY UNDERGROUND IRONORE ENTERPRISES (p. 20-27)

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This paper reports results of the study into assessing the features and devising a tactic for the development of structures for the systems that control levels of electricity consumption by receivers at iron-mining enterprises employing the underground technique for extracting iron ore raw materials (IOR). It is shown that the advantages of the proposed structure, compared with existing variants, is the implementation within its functional of control solutions that are predefined by the specificity in the operational technology of electric energy (EE) receivers at these types of enterprises. The solution became possible based on the unification of the electrical energy complex of these enterprises into a single structure: electricity supply systems – EE receivers. A list of consumers has been compiled, which form a shape of daily timetables of electrical loads at an iron ore enterprise – the so-called stationary installations that consume more than 80 % of the total consumption of EE. It is these consumers that were included in the category of EE receivers-regulators. Individual optimization of operational modes of the work of these receivers over a day's underlies the logic of control over the levels of EE consumption. Such a structure of optimization appears appropriate based on the fact that a price for the EE consumed by an enterprise over 24 hours is formed by the energy-generating organization differentiated in a function of zonal tariffs: peak, half-peak, night. Upon determining a dependence of energy consumption levels by the receivers-regulators on controlling and perturbing variables, it has been established, and recommended for implementation, to control the level of EE consumption based on the substantiated and predefined criteria, whose essence comes down to the minimization of this indicator.

The present work has synthesized a mathematical model, based on which the algorithm of control was designed. This makes it possible to not only minimize the level of power consumption by taking into consideration the zonal tariff prices for the EE consumed, but to control flows in the cases of possible limitations for the levels of electricity supply by the side that supplies power to an energy system.

Keywords: control algorithm, optimization of electricity consumption by iron ore enterprises, functional-technological structure, zonal tariffs.

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FORMALIZATION OF SELECTION OF CONTRACT-ORGANIZATIONAL PROJECT DELIVERY STRATEGY (p. 28-40)

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The formalized system to select a strategy for the implementation of a capital construction project was developed. This is important because an error in making a strategic decision (in an intuitive rather than formalized way) critically affects the further course of events on a project and usually cannot be fixed through the efforts of tactical and operative control. Throughout the whole range of strategies, a number of those, which have characteristic features, and therefore affect specifically project initiators, were determined. Discreteness of the field of alternatives gives a possibility to avoid "fuzziness" in making decisions on the most appropriate strategy. The system became unified through the separation of two elements in it: (1) variable (movable) context that recognizes the features a specific business situation and the specificity of the analyzed project, (2) constant (unmovable) context that reflects the properties of each of the alternative strategies. The business process of comparative analysis involves three stages: assessment of the organization maturity, identification of the market development level, determining project priorities and conformity of a priority complex with the profiles of key contract-organizational models. The first stage gives an answer to the question: "Is it worth following a multi-variant contract-organizational scheme of project management?", the second one solves the problem "Is it worthwhile applying IPD in the current situation?" and the third one gives a response to the question "Which of the contract-organizational models of the analyzed project should be followed?" Thus, the conceptual model reflects all available alternatives of typical strategies that are applied in the international best practices. The total number of key basic contract-organizational alternatives includes 26 strategies. Both the project space, and the field of strategic alternatives are reflected in an integrated coordinate system "time–costs–value–risk" by the conceptual model. The formalized toolset formed the system of the project agreement-organization models COMPAS. The formalized system makes it possible to make unambiguous well-grounded decisions on project delivery strategies, which in practice will lead to better project results.

Keywords: engineering of business processes, multi-criteria analysis, strategic decision-making, project delivery models.

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SUBSTANTIATION OF QUANTITATIVE COMPOSITION OF CONSIGNMENTS IN ORGANIZING AGGREGATED SHIPMENTS IN CONTAINERS (p. 41-47)

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The task of substantiating quantitative composition of cargo batches during formation of aggregated shipments in containers was studied.

As a result of the study, a general formulation of the problem of substantiating quantitative composition of consignments during organization of LCL transportations was obtained, and particular versions of its interpretation were defined. To solve local production problems, some technologies have been developed that take into consideration peculiarities of situation and initial information on the planned shipment. The use of these technologies ensures maximum utilization of technical and operational capabilities of the container in formation of aggregated shipments of cargoes. For the first two versions of the task, the technology provides implementation of certain systems of equations and verification of obtained results with regard to the quality of utilization of the carrying capacity and freightage of the container. To solve the problem of the third and fourth versions of the developed mathematical models, implementation of the models ensures maximum utilization of technical parameters of the container due to the optimality criteria reflected in the corresponding objective functions. Therefore, verification of the obtained results with regard to the quality of utilization of carrying capacity and freightage of the container is not required.

Based on the proposed methodological provisions, experimental studies were carried out that have shown universality of solving problems of optimizing loading of consolidated containers.

The developed provisions are of scientific importance. They contribute to the development of a theory of transport processes and systems and are of practical interest for commercial departments of transport companies that provide cargo forwarding services. Introduction of these provisions will ensure an increase in efficiency of production activities of representatives of the transport business and will also enable formation of rational systems of cargo forwarding services for cargoes in regional, interregional and international transportation.

Keywords: container, less than container load (LCL) transportation, cargo forwarding activity, container loading.

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ALGORITHM FOR SELECTING THE WINNING STRATEGIES IN THE PROCESSES OF MANAGING THE STATE OF THE SYSTEM "SUPPLIER – CONSUMER" IN THE PRESENCE OF AGGRESSIVE COMPETITOR (p. 48-61)

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The issue examined in this work relates to the search for an optimal pricing strategy by an enterprise-supplier in case it faces a new competitor that offers products at a lower price. The emergence of such a problem necessitates looking for a rational way to reduce

its selling price, in order to prevent losing in an aggressive competitive environment, formed by new players entering the market with proposals that are obviously better. To resolve this problem, we have developed an algorithm for selecting the winning strategies based on the estimation of strategic capabilities of a competitor under conditions of uncertainty.

It has been proposed, in order to assess the cost of a product in the system "supplier-consumer", to apply the concept of the l-level scale. It is shown that, given such a representation, it becomes possible to employ a dimensionless estimation of product pricing, regardless of its type or natural cash value. For a formalized description of relations between an enterprise- supplier and a competing company, it is proposed to use the theory of strategic games, in which a game matrix is built based on universal regression equations. A feature of the proposed solutions is that the value of winning in the game matrix is defined by solving an optimization problem based on the regression equation that describes the impact of transportation costs, profit, and a value-added tax (VAT) on the price of the game. It has been established that, given such a description, the game that is played has a saddle point with the net price of the game z=−0.5. Based on mathematical modelling, it was established that the selection of a supplier company is limited by strategies at which own profit must be close to the average or the minimally possible value.

We have constructed a predictive model for strategic opportunities of a competitor in the system "supplier-consumer", representing a universal regression equation. Based on it, an adjustment of numerical indicators for the components in product pricing can be made. It is shown that such an adjustment allows the existence of multiple alternatives, neutralizing competitor's advantages. We have substantiated constraints for the solutions derived, related to two factors: an assumption about the accuracy of determining the pricing components of a competitor, and the presence of taxation specificity in international cargo transportation.

Keywords: system "supplier-consumer", l-level scale, strategic opportunities, optimal strategy, game price, regression equation.

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CONSTRUCTION AND ANALYSIS OF THE MODEL FOR STOCHASTIC OPTIMIZATION OF INVENTORY MANAGEMENT AT A SHIP REPAIR YARD (p. 62-70)

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A stochastic model of work of inventory management system at a ship repair yard (SRY) has been developed. In order to account for factors related to uncertainties and risks (random moments of arrival of ships at SRY, random volumes of repairs), it has been proposed to apply the apparatus of Markov drift processes for modeling. These processes make it possible to take into consideration the discrete character of change in the number of vessels at SRY, as well as the ongoing character of fluctuation in the inventory level of materials in warehouse. In this case, docks at SRY are interpreted as a queueing system. It is also assumed that the restocking of materials at a warehouse and their utilization during repair of ships is carried out continuously, at constant intensities, but depending on the availability of a material in warehouse. The result of this study is the stated problem on stochastic optimization of intensities in the resupply of materials based on the criterion of minimum cumulative average current expenses of the yard, which also take into consideration the losses associated with additional downtime of ships due to the lack of materials in warehouse during repair. It has been shown that the results obtained are important to the practical operation of SRY supply department as they make it possible to build a strategy for the replenishment of materials in stock at SRY under conditions of time-dependent non-uniformity in the need for ship repairs. From a theoretical point of view, the obtained results demonstrate a possibility of using the apparatus of Markov drift processes to solve various problems on optimal inventory control under conditions of random fluctuations in the demand for materials in warehouse.

Keywords: shipyard, queueing system, materials stocks, risk of idle vessels, optimal inventory management.

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STUDY INTO CONDITIONS FOR THE INTERACTION BETWEEN DIFFERENT TYPES OF TRANSPORT AT INTERMODAL TERMINALS (p. 70-76)

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The study conducted into organization of the interaction among various types of transport at intermodal terminals found that it is necessary to improve the technological process of a terminal to achieve effective functioning of transshipment terminals. Specifically, it is necessary to provide basic requirements, such as continuity, rhythm, parallelism and sequenced-flow of all operations and maximum combination with the high quality of unconditional use. The study proved that achievement of appropriate conditions is possible when using the descriptive model of a two-port terminal. It operates due to the processes of self-synchronization of movement of automated platforms, which transport containers between a road portal and a railroad portal. The study established that we must solve the design problem of creation of perfect computer models for needs of organization of the interaction of various types of transport at intermodal terminals in a combination of descriptive model and analytical model. These models include software components and hardware components that provide conditions for implementation of the concept of self-synchronization movement of forklift trucks. Specifically, the study found that the self-timed control approach provides a greater degree of coordination in operation of a container terminal. That makes it possible to improve the parallelism of processes, that is, simultaneous implementation of events within a system.

The study showed a possibility for the formalization of processes of self-synchronization by means of Petri nets. This mathematical apparatus is very convenient for modeling dynamic discrete systems and makes it possible to explore the sequential execution of all processes, which occur at an intermodal terminal. Based on the simulation, the study proved that an average container demurrage at a terminal diminishes, which makes it possible to increase processing capacity and to reduce unit costs for processing a container at a terminal.

Thus, there is reason to state that it is quite possible to develop technologically complete "seaport-railroad portal-automobile portal" terminal structures in various configurations. The type of configuration depends on selected logistics routes for delivery of good. We should apply the method of organization of operation of a two-port terminal for this purpose.

Keywords: self-synchronization, Petri net, intermodal transportation, container terminal.

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