ABSTRACT AND REFERENCES

CONTROL PROCESSES

DEVELOPMENT OF A RELIABILITY MODEL TO ANALYSE THE CAUSES OF A POULTRY MODULE FAILURE (p. 4-9)

**Serhiy Shcherbovskykh,
Nadiia Spodyniuk, Tetyana Stefanovych,
Vasyl Zhelykh, Volodymyr Shepitchak**

A mathematical model of reliability has been developed for a poultry module. The suggested reliability model is designed for quantitative analysis of the causes of such a system failure. The reliability of the module for keeping poultry is formalized with a fault tree, which sets logical conditions for the appearance of the system failure. A failure is recognized as formation of such a microclimate in the area of keeping poultry that potentially threatens the birds' lives and health. For the module, we distinguish between two main types of violation in its functioning – violation of the temperature control and violation of the ventilation mode in the box. The first case can pose the poultry a threat of hypothermia, and the second results in a lack of fresh air. The fault tree is used to form a homogeneous Markov model that is applied to calculate the characteristics of the system reliability. The model has helped determine the probabilistic characteristics of all causes of failure and the percentage contribution of each cause for a specified operating time. It has been revealed that the biggest contribution to the module failure is made by a simultaneous incapacity of the infrared heater and the calorifier, the exhaust fan failure, and the supply fan incapacity.

Keywords: poultry module, reliability model, fault tree, Markov model, failure cause, catastrophic failure.

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IMPROVING THE PROCESSES OF COST MANAGEMENT IN THE CONSTRUCTION AND ENERGY PROJECTS (p. 10-17)

**Vladimir Babaev, Maria Sukhonos,
Alona Starostina, Igor Beletsky**

The processes of the cost management of construction-energy projects were improved by expanding the existing set of tools of project management by the method of planning the cost of construction-energy projects. The basis for developing the method is a hypothesis about specific features of the given projects being their structural complexity, significant resource intensity and duration, as well as a large number of stakeholders. This leads to a change in the costs of resources in the period of implementation of the project, and consequently, creates deviations towards its increase over its planned budget. These deviations can be forecasted and considered by using the developed method of planning the cost of construction- energy projects. This method, in contrast to the existing ones, is based on the theory of changeability in

the costs of resources over time and it also considers investment and time constraints of the project.

A verification of the proposed method was conducted, it was revealed that its results are more realistic, i. e., they are more in line with the actual data than the results, obtained by application of classical methods of planning the cost of projects.

The developed method of planning the cost of construction-energy projects can be used for the projects in different directions provided they are long-term and expensive resources comprise a considerable share of their budget.

Keywords: cost planning method, procedure of reduction, construction and energy projects, resources, long-term timeframe.

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DEVELOPMENT OF QUALIMETRIC APPROACHES TO THE PROCESSES OF QUALITY MANAGEMENT SYSTEM AT ENTERPRISES ACCORDING TO INTERNATIONAL STANDARDS OF THE ISO 9000 SERIES (p. 18-24)

**Roman Trisch, Elena Gorbenko,
Natalia Dotsenko, Natalia Kim, Ganna Kiporenko**

For the assessment of the processes of the system of quality management (QMS) at enterprises, it is necessary to bring all estimations of the indicators of quality of the processes to one, desirably a dimensionless, scale of measurements. As the function of desirability for the conversion of various dimensional indicators of quality into a dimensionless value, applying a desirability function is proposed.

A peculiarity and a difference from the existing functions of desirability is the fact that it takes into account maximally permissible and minimally permissible values of the indicator of quality of a process, and also its best (optimal) value. In addition to this, the parameter of form and steepness of function is present, which will make it possible to use them for the assessment of the processes of different significance with different requirements for quality.

It is proposed to assess QMS through the values of the set of interconnected processes, i. e., to combine the assessments of different processes into one set of data and to estimate this set as a whole. This procedure will make it possible to increase the amount of information about the estimations of quality of the system as a set of processes, which will allow assessing the system as a whole with higher objectivity and reliability. The solution to this problem is proposed by statistical methods, using parametric and nonparametric statistics, since they do not require the knowledge of the law of distribution of a random value.

Keywords: quality management system, quality indicator, assessment criterion, nonparametric statistics, graphic model.

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IMPROVEMENT OF THE ACCURACY OF DETERMINING MOVEMENT PARAMETERS OF CUTS ON CLASSIFICATION HUMPS BY METHODS OF VIDEO ANALYSIS (p. 25-30)

**Sergey Panchenko, Ivan Siroklin,
Anton Lapko, Alexandr Kameniev, Sergii Zmii**

The study proves that it is necessity to develop and specify the procedures of using a synthesis of the methods of optical flow and background subtraction in the case of controlling objects of complex shapes on a changing background and in the presence of small moving objects that are not subject to tracking. Research in this area can yield significant results to automate the movement parameters control over objects such as railway transport.

For the described conditions of practical use, it is most of all advisable to synthesize the classical Lucas-Kanade method of optical flow and the Horn-Schunck method for segmenting the frames and identifying control zones. The study describes the procedures of choosing the size of control zones and analysing a joint movement in these areas, which makes it possible to identify the movement of a cut even if the cut has been formed from different categories of wagons.

The suggested algorithms were tested on the classification hump at Odesa – the Classifying Section station (Ukraine). The obtained quantitative characteristics of the accuracy of recognizing cuts show that the conditional probability of correct work of the suggested approach is 0.8332, compared with 0.44 in the case of the classical Horn-Schunck method under the same conditions.

Keywords: video analysis, optical flow, background subtraction, monitoring the parameters of cuts' movement, classification hump.

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A METHOD OF DETERMINATION OF PORT TERMINAL CAPACITY UNDER IRREGULAR CARGO DELIVERY AND PICKUP (p. 30-38)

Mykhaylo Postan, Lyudmyla Kushnir

There was built up and analyzed a stochastic model of a work of a port terminal that takes into consideration irregularity of delivery and pickup of a cargo. It is supposed that a terminal consists of n interchangeable moorages, in which there is carried out loading to ships. The ships arrive to a terminal to take a cargo independently on each other, their total number is equal to N. Time from departure of any loaded ship to the moment of its arrival to a terminal is a random variable that is distributed according to the exponential law. All cargoes, that come to a terminal with a help of land transport, are immediately unloaded to a storehouse. It is supposed that a stream of incoming cargoes is described with a model of the compound Poisson process with zero drift. From a storehouse cargoes are loaded to any shipl that is in a moorage, with the rate W. With use of non-standard type of the Markov process with drift for finding of limit join distribution of number of ships, that are in moorages, and amount of cargo, that is in a storehouse, there is got a system of integral-differential equations together with relevant boundary conditions. There is given a method of solving of this boundary-value problem, that is based on use of the Laplace-Stieltjes transformation for getting of a solution in a closed form. It gives a possibility to get simple calculation formulae for assessment of indices of capacity of a terminal: the average number of ships in moorages, the average amount of cargo in a storehouse, possibility of demurrage of ships because of absence of cargoes in a storehouse and etc. There are given examples of practical use of the got theoretical results, namely: a method of calculation of necessary capacity of a storehouse, assessment of a term of recoupment of a project of construction of a terminal. They showed that the worked out method of calculation of capacity of a port terminal in conditions of irregularity of a work of transport can be used in project calculations.

Keywords: a port terminal, a capacity, irregularity of delivery and pickup of cargoes, service system.

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DevelopING A USER-Oriented APPROACH TO SELECTION OF GEOSPATIAL DATA BASED ON FUZZY LOGIC (p. 38-45)

Ganna Bielcheva, Nataliia Makogon, Nataliia Manakova

The work considers the approach to selection of geospatial data, oriented towards the user's requirements. The methods and models are presented for evaluation of quality and selection of the sets of spatial data with the aid of fuzzy logic.

The model of evaluation of the quality of spatial data was designed, which fully agrees with the elements of quality of a series of the international standards ISO 19157. The model makes it possible to comprehensively consider the requirements of user in the selection of spatial data for the formation of information provision of GIS–applications. Within the framework of the model, the methods of selection of spatial data according to the indicators of thematic and positioning accuracy were developed. The method of thematic accuracy is realized under conditions of the lack of the reference cartographic material. The method of selection of spatial data according to the indicator of positioning accuracy provides for the possibility of correcting an error of the planned and high-altitude accuracy and presents the result in the form of expert recommendations. Furthermore, this approach is realized in the prototype of a system, which makes it possible for the users to consider their requirements in conjunction with the indicators of quality of geospatial data. This system allows forming information provision of GIS-applications, and its verification in several projects of different thematics demonstrated positive results of taking onto account the needs of users at the stage of selecting the data.

Keywords: geo-information systems, information provision, geo-spatial data, quality evaluation, fuzzy logic.

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