ABSTRACT AND REFERENCES

CONTROL PROCESSES

IMPROVING THE TRANSPORT CYBER SECURITY UNDER DESTRUCTIVE IMPACTS ON INFORMATION AND COMMUNICATION SYSTEMS (p. 4-11)

Valeriy Lakhno, Andriy Hrabariev

The information and communication environment of transport (ICET) is focused on interaction with other sectors of the economy in order to reduce delays in shipping, handling of marine and river vessels, containers, wagons, vans through the use of electronic payment systems, "Client-Bank", etc. Possible failures, caused by cyber attacks in systems of such level of complexity require new research of information security (IS) of ICET with emphasis on accessibility, stability, and integrity of the information stored and processed in information systems (IS) and the automated control systems (ACS) of the transport industry.

The paper presents the results of research aimed at developing cyber threat detection methods and models for ICET and enhancing their stability under formation of a single information space, introduction of new and modernization of existing IS and ACS in transport and increase in the number of destabilizing effects on the information availability, safety, and integrity. The method of intelligent cyber threat detection based on discrete procedures using the apparatus of logic functions and fuzzy sets is proposed. It will improve the cyber attack detection efficiency, and can also be used to design new hardware and software solutions for systems of cyber defense of ICET.

Keywords: information and communication environment of transport, cyber security, information security, threat detection.

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DEVELOPMENT OF CONCEPTUAL FRAMEWORKS OF MATRIX MANAGEMENT OF PROJECT AND PROGRAMME PORTFOLIOS (p. 12-18)

Iurii Teslia, Tatiana Latysheva

The paper discloses the features of management of the standard project and programme portfolios (SPPP) based on the analysis of the authors' experience and existing approaches to integration of project and portfolio management in domestic manufacturing companies. It is shown that these features require the implementation of an organic relationship between the systems of management of individual standard projects and programmes and management of SPPP in general. Key problems in the management of standard project and programme portfolios (SPPP), namely the lack of an effective approach to division of powers between the management of individual projects and programmes and management of project and programme portfolio, as well as shortcomings in the management tools are singled out. The research objective - development of conceptual frameworks of matrix management of SPPP is formulated. The ways of integration of the management of individual projects and programmes and management of SPPP using the matrix model, based on key portfolio events are outlined. For this, the key events, the control over which is taken to the level of SPPP management are selected in the set of project works. The scheme of attributing

the key events to the information environment of the management systems of standard project and programme portfolios is given. The conceptual frameworks of matrix management of SPPP in the design and operational activities of manufacturing companies are proposed. The results of the introduction of the matrix management technology in the domestic project-oriented companies Karbon LLC, ICD Investments, Skaeton LLC and others are presented. It is shown that the use of tools based on the concept of matrix management of SPPP greatly (by 30–50 %) increased the efficiency of project-oriented businesses of the companies. The efficiency of management tools of project and programme portfolios, developed within the concept of matrix management of SPPP confirmed the reliability of the theoretical results obtained. The materials of the paper can serve as a source of further spread of ideas and conceptual frameworks of matrix management technologies of SPPP to improve the efficiency of project-oriented businesses of manufacturing companies.

Keywords: matrix approach, standard projects, portfolio event, project and programme portfolio.

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DEVELOPMENT AND ANALYSIS OF DYNAMIC OPTIMIZATION MODEL OF TRANSPORT FLOWS INTERACTION AT PORT TERMINAL (p. 19-23)

Yuriy Kruk, Mykhaylo Postan

An approach to the construction of the dynamic optimization model for operational control of spotting freight trains at the port terminal, as well as the process of transferring cargo from cars to warehouses and from warehouses to vessels under a given arrival schedule of vessels at the terminal is proposed. In this case, the port terminal is considered as a part of the logistics system. It is assumed that the terminal capacity is limited only by the warehouse capacity. The approach is based on the methods of inventory management theory, namely, the Wagner-Whitin generalized dynamic model. Two optimality criteria such as maximum profit of the port terminal operator and minimum total costs associated with the transfer of cargo and demurrage of vehicles on a given planning horizon are considered. The optimization problem is reduced to a linear programming problem of a special form. A numerical example showing the practical usefulness of the model in the operational planning of the terminal is given.

Keywords: port terminal, operator, traffic flow, coordination, optimization, car spotting schedule, inventory theory.

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SIMULATION OF CHANGES IN THE STEADY STATE AVAILABILITY FACTOR OF SHUNTING LOCOMOTIVES FOR VARIOUS MAINTENANCE SYSTEMS (p. 24-31)

Anatoliy Falendysh, Andriy Sumtsov, Oleksandr Artemenko, Olga Klecka

The changes in the steady state availability factor of shunting locomotives depending on maintenance factors are determined. Based on the existing approach to determining the steady state availability factor and the accepted system of scheduled preventive maintenance of shunting locomotives, the model that allows the computations with the possibility of changing various parameters is developed. This model is a mathematical description of the steady state availability factor of shunting locomotives taking into account the structure of the maintenance and repair system adopted in Ukraine.

On the basis of the model developed, which was implemented in the MATLAB software environment, the simulation of changes in the steady state availability factor depending on the maintenance and repair system, fueling strategy, life extension, mean operating time to unscheduled repair and downtime is conducted.

Upon the simulation results, mathematical dependences of changes in the steady state availability factor on the parameters of unscheduled repairs (mean operating time to unscheduled repair and downtime) are obtained. They are the second-degree polynomials. From the structure of equations and the values of factors obtained, it is concluded about the similar effect of unscheduled repair parameters on the steady state availability factor of various maintenance strategies.

Keywords: shunting locomotives, maintenance system, steady state availability factor, locomotives, availability function.

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THE DECISION-MAKING MODELING FOR THE BUILDING PROJECT SCOPE EVALUATION IN CONDITIONS OF THE RECREATIONAL TERRITORY DEVELOPMENT (p. 32-37)

Tetiana Fesenko, Galyna Fesenko, Dmytro Minaev

The information content of the decision-making process for the building project scope evaluation is outlined, and its basic structure is revealed. The multidimensional system of criteria for the development and evaluation of the scope of the ski resort building project is analyzed. The system of characteristics of ski resort infrastructure is developed. The method of its integration in the project scope evaluation process is proposed. In a structural and logical sequence of the decision-making process to assess the project scope, the place for the model of selecting the functionality of the hotel complex with many requirements to a specific property is determined. Guided by the project management methodology, solutions to integrate the project

scope evaluation by beneficiaries are proposed. The project scope evaluation system includes the development features that allow project managers to focus on not only the obvious benefits of the project, but also getting more through a positive impact on the development of stakeholders' potential.

Keywords: project scope management, unique hotel complex, ski resort infrastructure.

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DEVELOPMENT OF COMPONENT OF INTELLIGENT COMBINED MODEL OF SIMULATOR FOR TRAINING SKIPPERS IN TRAWL AND PURSE SEINE FISHING (p. 38-45)

Nadezhda Smetiukh, Anatoliy Shnurenko, Sergei Golikov, Vladimir Zhukov, Sergei Chernyi

Currently, training centers of the world leading countries are looking for the ways, techniques and methods to improve the training efficiency and quality, providing various groups of trainees with support of their self-learning activities, computer-based training, collective and individual solution of training and practical problems. All this determines the relevance of improving the methods of knowledge presentation and measurement in training and testing systems, developing new techniques, methods, models and algorithms for adaptive control of training and knowledge testing processes. Analytical models of five types of trainees and training management events are synthesized in the form of classes of management alphabets and trainees. Analytical models of trainees and management events allow determining and changing the type of the trainee at each stage of studying the materials of the discipline depending on the knowledge testing results at a certain stage and making decisions on the training process management depending on the trainee's information assimilation results. This makes it possible to adapt the TTP (training and testing process) in PC of the ITTS (intelligent training and testing simulator) network to the individual characteristics of trainees and dynamically manage the TTP. The organization model of the management system of CTTS (computer training and testing system) adaptive to the characteristics of trainees and a block diagram of the adaptive ITTS are developed based on the analytical models of trainees and management events. The management criterion of the adaptive ITTS is initialized. The classification methods of situations and management criteria of the training and testing process in eliminating critical situations are developed. The training and testing process model and functioning algorithm of the TTP in the ITTS network are designed.

Keywords: information technology, adaptive control, models, criteria, algorithm, computer-based training.

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A GEOINFORMATION SYSTEM OF "THE HYDROCOMPLEXES OF UKRAINE" AS AN IMPORTANT PART IN SUPPORTING MANAGERIAL DECISIONS (p. 46-53)

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Technogenic and environmental safety of hydrocomplexes is an important part in the system of national security, and making prompt managerial decisions in this area is an important factor of a sustainable development of Ukraine. However, the existing problem of subordination of different parts of a hydrocomplex complicates and even impedes a prompt assessment of the actual safety of the complex engineering facilities for future managerial decisions.

The study was aimed at working out an effective, representative and easy-to-use geographic information system (GIS) of "The hydrocomplexes of Ukraine" based on the principles of a multicriteria complex assessment of the technogenic and environmental safety of hydrocomplexes of Ukraine as complex environmental, technogenic, geological, engineering, and technical systems.

The test objects of the specified GIS comprised 18 major hydrocomplexes of Ukraine, for which we had researched and provided a large volume of data on various aspects of their operation.

The designed structure of the GIS and the implemented software product thereof can be useful not only for managers and scientists dealing with the operation of hydraulic structures but also for the general public that may be concerned with environmental issues in the regions of Ukraine.

Keywords: hydrocomplexes of Ukraine, geographic information system (GIS), technogenic and environmental safety, sustainable development, hydrocomplex exploitation.

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