

Simulation Modeling of Process of Damaging of Network Pipeline Structures

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Pp 6 – 19

The approaches to assessment of the functional state of pipelines in the presence of continuous technological processes and complex industries are substantiated. Stability characteristics and a simulation modeling program for the process of damage to network structures of pipeline transport systems are calculated. It is shown that the ability to resist the process of progressive damage of such systems depends on their structure and composition. The developed software makes it possible to perform a comparative analysis of the properties of alternative structures and to take reasonable design decisions at the stage of formation of transport systems with specified properties.

Keywords: pipeline transport, system, structure, simulation modeling.

Increase in Informative Value of Railway Track Maintenance Assessment

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Pp 20 – 31

Using the methods of statistical analysis based on the theory of random process emissions, the theory of random point processes, the method of least squares, the method of least modules, filtering algorithms, the choice of a type of a theoretical function and its parameters that allow reducing the error of the measured characteristics of defects and deviations of the track from the design position, a mathematical model is formulated that provides an increase in the informative value of the assessment of the actual state of the railway track. High information value is needed primarily for formation of adequate control actions on the track in order to ensure traffic safety.

Keywords: railway track, measured parameters, information-measuring system, defect detection, statistical analysis, theory of random processes, mathematical model.

Features of Experiments based on Process 3D-Model of the Station

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Pp 32 – 37

A 3D-model can become an isomorphic one if there are no significant differences between the actual image and its likeness (the prototype). Theoretical evaluation of the results of observation of real technological processes at the railway station and imitating them in the course of experiments of model analogues, recreating the dynamics of all operations based on calculation and three-dimensional reproduction with correct physical phenomena of gravitation, resistance, inertia and the presence of other accompanying reactions. Model physics confirms the possibility of reconstructing multiple effects of controlled actions within the time quantum of the forces being calculated.

Keywords: railway station, design, process approach, experiment, 3D-model, information technologies.

Operational Elastic Properties of Chaotically Reinforced Tribocomposites

Kolesnikov V. I., Bardushkin V. V., Sychev A. P.

Pp 38 – 46

The problem of predicting the operational elastic properties of composites based on binders with a high content of epoxy groups (the grade of EPAF and its modification), chaotically reinforced with short polyimide (or glass) fibers with antifriction disperse additives of polytetrafluoroethylene was solved. Numerical model calculations of the effective elastic characteristics (Young's modulus and Poisson's ratio) of these tribocomposites were made taking into account changes in the concentrations of their components.

Keywords: transport engineering, modeling, tribocomposite, inclusion, epoxy binder, effective elastic moduli.

Accelerated TINES Technologies for Tram Tracks

Czerlunczakiewicz Włodzimierz

Pp 48 – 59

The article presents a way to organize repair of a tram track in the street with a large traffic load. In connection with the special location of the facility, the key aspect in the choice of technology was a short period of work, with mandatory obtaining of high technical and operational parameters ensuring long-term and reliable operation of the rail track after reconstruction.

The contractor used a TINES LC–L XL type system, the main element of which is a prefabricated reinforced concrete plate 17 m long, with a built-in ERS-M module. The repair technology and the construction of tram tracks were chosen to limit the risk of a possible extension of the project implementation time. This was in line with the investor's expectations, the main goal of which was to spend not more than 60 hours to dismantle and upgrade.

Keywords: tramway, track, track superstructure, repair, accelerated technologies, TINES LC–L XL, Krakow, quality.

Methods for Controlling Vibration Parameters of Passenger Coaches

Skachkov A. N., Samoshkin S. L., Zaytsev A. V.

Pp 60 – 73

When the car building plant in Tver began serial production of new generation passenger cars, its specialists had to face the facts of not always justified modification of, it would seem, already comfortable and safe designs. In particular, weakened vibration parameters during the construction of lounge cars, bars, laboratories were found out. The feasibility of reducing the vibration indicators of the lounge car by increasing the bending stiffness of the body and selecting the most rational vertical damper of the central suspension is given.

Keywords: railway, car building, lounge car, vibration, smooth running, bending stiffness, design, testing, parameters' control.

The Developments of Hybrid Road-Rail Rolling Stock in Russia

Tarasov D. E.

Pp 74 – 80

The article deals with the aspects of the development of hybrid road-rail rolling stock – automotive tractors of various purposes equipped with devices for movement along the railway track. Information is provided on the design features, single and serial models of machines built by the plants of the USSR and modern domestic enterprises. Depending on the specificity and type of hybrid road-rail equipment, the author identifies the current problems and directions of development of hybrid road-rail vehicles, the design and production of which are designed to become at least ordered, technological and standardized.

Keywords: hybrid road-rail transport, rolling stock, road transport, rail transport, innovations.

Analysis of Controllability of a Freight Car Brake System

Ivanov A. A., Kozarezova M. A.

Pp 82 – 96

The article considers failures of a brake system of a car, leading to train delays, their causes are determined, and an analysis is made of the control- and maintainability of the elements that are subject to regular maintenance. Recommendations are formulated aimed at reducing train delays on guarantee sections caused by a failure of a freight car brake system. At the same time, the emphasis is on an integrated approach that implies a wide range of tasks, including the stages of design, construction, operation and financial and economic support of the process.

Keywords: railway, freight car, brake system, maintenance, failure, controllability, maintainability.

Problems of Transport Accessibility and Connectivity in the Northern Regions.

Part II How to Avoid the Syndrome of Isolation from «Big Land»

Macheret D. A., Macheret Yu. Ya.

Pp 98 – 107

The article, published in two issues of the journal, addresses the problems of development of transport infrastructure in the northern regions of Russia (Part I: Priority of roads, land communications, Part II: How to avoid the syndrome of isolation from «metropolis»). The conclusion is substantiated that in order to ensure their attractiveness, comfort of living, increasing the population density, creating conditions for long-term sustainable social and economic development of the territories, it is necessary to deal more with the infrastructure of land transport and, above all, the railway, which would be of a supporting nature and would strengthen the position of the transport complex in the north. It requires strategic planning for development of each type of transport, taking into account the prospects for industrial development of low-income arctic regions and long-term needs of people in creating a comfortable environment and favorable conditions for active and full-fledged life, in conjunction with the natural and climatic features of the region and their projected changes.

Keywords: transport, northern regions, social and economic development, land transport infrastructure, natural and climatic conditions.

Baikal-Amur Mainline and Development of Tourism in Eastern Siberia

Rappoport A. V.

Pp 108 – 115

The richest natural reserves that the Siberian and Far Eastern regions have along the Baikal-Amur Mainline (called in short in conformity with Russian practices as BAM) make this zone more attractive for tourists and people ready to go here for balneological resorts, mineral waters, all kinds of mountain, water and any other trips and excursions. Opportunities of the region are assessed in the article, proceeding from the really existing prerequisites for development and outlined prospects for individual territories, projects and spheres of activity.

Keywords: Baikal-Amur Mainline, Eastern Siberia, Far East, tourism, economy, development of new territories, transport complex, development potential.

Siberian Transport & Logistic Platform: a Tool to Attract Investment

Guts A. V.

Pp 116 – 123

The problem of labor and social mobility of people in conditions of economic uncertainty and search for strategies for economic growth is becoming increasingly important. And in the language of the transport worker, in this case, we should talk about the points of «attraction of passenger flow». The article deals with the issues of expanding and strengthening communication links between people by improving the service and providing customers with combined transport and logistics services. The organization of a regional trans-logistic (further on understood by the authors as integration of transportation and logistics) platform – the network economic space of interaction and cooperation of transport companies on the basis of an integrated approach to servicing the population and modern information technologies – is proposed as a tool for solving such a complex task.

Keywords: mobility, transport and logistics services, value chains, technological integration, integrated approach model, network cooperation, trans-logistic platform.

Efficiency of PPP Mechanisms for Development of Transport Infrastructure

Volkov B. A., Dobrin A. Yu.

Pp 124 – 139

The spheres of application of public-private partnership continue to expand. Concession agreements are regularly used in transport, especially in road construction. However, any such option requires comprehensive calculations, an

integrated approach, reducing the risk to partners to a minimum, because only a spectacular project can be attractive and profitable when it comes to long-term investment. The authors of the article reveal step by step the mechanisms of interaction between the parties in implementation of infrastructure projects, consider in detail the mathematical apparatus that assesses the budgetary effectiveness of investment programs, distribution of burden between the state and private partners throughout all stages of the life cycle of projects within the framework of PPP.

Keywords: public-private partnership, concession, economy, transport, infrastructure, life cycle of the project, efficiency, investment load.

Digital Logistics and Electronic Data Exchange in Freight Transportation

Lyovin B. A., Efimova O. V.

Pp 142 – 149

The article depicts approaches to building a new model of interaction and system optimization of business processes based on the use of digital technologies at all stages of shaping the value chain of products and services that provide the creation of an information platform for digital economy. The methodical foundations of formation of the evidence base for development of digital logistics and introduction of legally significant electronic data exchange in the organization of rail transportation are considered.

Keywords: digital technologies, freight transportation market, electronic document management, information system of organization of relations with customers of the holding Russian Railways in the field of freight transportation, losses in the transport sector.

Process Approach as a Basis for Increasing the Efficiency of Freight Owners' Servicing

Eliseev S. Yu., Kulieva E. S.

Pp 150 – 157

The article raises the question of creating a freight transportation management system that takes into account the working conditions in the market environment and ensures the quality and efficiency of freight owners' service in railway transport. From the whole set of options considered the use of process-oriented operating system of freight cars operation is considered as the most promising direction by the authors. Advantages of this approach are shown in sufficient detail and practical recommendations of organizational and technological and methodical nature are provided.

Keywords: railway, freight car, freight owners' service quality, management, transportation, efficiency, functional approach, process approach, model, parameters.

Myanmar's Transport Infrastructure: Development Vectors

Sinitsyna A. S., Delz S. V., Ko Ko Lwin

Pp 158 – 163

The authors assess the current state and problems of Myanmar's transport infrastructure. A list of tasks has been determined, the solution of which will significantly improve its condition, help to achieve inclusion of the country's transport system in the international transport network and significantly improve trade turnover with China and countries of Southeast Asia. Priority actions in private and public sectors of the economy are named, the implementation of which will lead to development of existing and formation of new trade routes.

Keywords: transport system, infrastructure, Myanmar, communication routes, transport technologies, dry ports, logistics centers.

Modernization of Methods of Safe Conducting of Operations at Rail Tracks

Khoroshev V. V.

Pp 166 – 177

The article describes the methods of safe production of works on railway transport, including the monitoring system «Worker on tracks». Ways to control the technological process while servicing railway infrastructure devices, for example, signaling, centralization and blocking distance, in particular, the control method using radio frequency identification (RFID) technologies, are presented. The variant of modification of marking of devices and equipment is offered. The statistics of the state of labor protection at the range of the October Directorate of Infrastructure is presented. The use of innovations will reduce the number of accidents at work, increase the safety of operation of railways. In addition, a positive effect is achieved in the field of environmental safety.

Keywords: work safety, occupational safety, RFID technology, maintenance, rail transport, monitoring.

Operational Reliability of Cylinder Covers of Diesel Engine

Ryabko E. V.

Pp 178 – 187

A statistical analysis of failures of cylinder covers of diesel engines with different operating conditions was carried out. The histograms of their failures were

constructed with subsequent interpolation for an objective assessment of the effect of the operating regime on reliability of the nodes being tested. It was found out that under the conditions close to nominal, the temperature tension of the bottom becomes decisive for efficiency of the cylinder cover. When the operating loads decrease, the influence of the ambient temperature comes to the fore. The objectivity of the conclusion is confirmed by the fact that the research was carried out on the same brand of diesel engine under various operational conditions.

Keywords: diesel locomotive, diesel engine, cylinder cover, operation, failure statistics, interpolation, heat stress, temperature conditions, safety, reliability, prolongation of service life.

Modeling of the System of Natural Resources Management in Railway Industry

Tagiltseva Yu. A., Drozdov N. A.

Pp 188 – 195

The article considers the strategy of creation of ecological and economic system of nature management at enterprises of the railway industry. The process of managing such a system is revealed with the help of game theory and the construction of a game-theoretic model of development. The model proposed by the authors can serve as a basis for constructing an innovative scenario in which the possibility of combining, in a strategic perspective and under given initial conditions, the economic benefits and goals of state environmental policy, corporate environmental programs, is mathematically proven.

Keywords: ecological safety, strategic planning, management, economy, nature management system, railway transport, game theory, development model.

Probabilistic Method for Rationing of EMC of Railway Automatics

Bochkov K. A., Komnatny D. V.

Pp 196 – 202

The scientific and technical problem of rationing of noise immunity level and rigidity of tests of railway automation and telemechanics is considered. The problem remains topical in connection with the widespread introduction of microprocessor and computer automation systems that ensure train traffic safety. The task is to find the norms of noise immunity on the basis of taking into account the probabilistic nature of the level of interference and the level of noise immunity of the hardware element base. The «load-stability» method was used to obtain equations for determining the normalized value of noise immunity. The norms calculated by the proposed method allow optimizing rigidity of tests and associated design solutions.

Keywords: railway, automation and telemechanics systems, electromagnetic compatibility, rationing, probabilistic approach, test methods, probability of failure, train traffic safety.

Development Based on Inter-University Cooperation

Kolev Petar, Todorova Daniela

Pp 204 – 209

The internationalization of higher education is one of the most important trends in social development. The article describes the market of educational services in the context of its high mobility and the main forms in which the process is implemented. Particular attention is drawn to cooperation of universities, exchange of experience, improvement of quality of knowledge, which is crucial for competitiveness of the nation and the state. The possibilities of transport education, its specificity and key problems against the background of global challenges of the present are considered.

Keywords: higher education, quality, internationalization, university, transport, mobility, cooperation.

Railwayman Shall not Live by Wages and Salary Alone

Epishkin I. A., Nikitin V. N., Frolovichev A. I.

Pp 210 – 225

The article is devoted to the study of regional features of social and economic relations in railway transport, which are directly related to stability of labor collectives, quality of human resources. A system of factors influencing staff turnover is offered, methods for analyzing the impact of these factors are considered taking into account regional aspects, approaches to modeling of functional dependencies and the use of correlation matrices are exemplified by the structural subdivisions of Central Directorate of Infrastructure, a branch of JSC Russian Railways.

Keywords: railway, infrastructure directorate, subject of the Russian Federation, labor relations, regional features, labor market, staff turnover, turnover factors.

«An Appearance Consistent with the Capital City»

Tikhonova T. Yu.

Pp 228 – 239

120 years ago, Emperor Nicholas II gave a green light to the construction project of Moscow Circle Railway. The uniqueness of this road was that, as an object

of the urban environment of the capital city, it should have an architectural ensemble of buildings, railway stations, infrastructure facilities, bridges, suitable for status purposes, and carry out passenger and freight traffic that meet the needs of the population. The article shows the main stages of project implementation, features of architectural solutions, a retrospective of development of the ring railway system up to the present day, including the largest reconstruction and modernization works of recent years.

Keywords: Moscow, circle railway, history, construction, architecture, creators, stations, bridges, reconstruction.

«Wires with High Voltage Transport Current»

Grigoriev N. D.

Pp 244 – 250

Dmitry A. Lachinov was born 175 years ago and nothing foreshadowed that a man appeared who would explain the theory of transmission (transportation) of electricity over long-distance via wires and without large losses, using high-voltage currents (over 1000 V), power transformers and a three-phase alternating current system. That was Dmitry Lachinov who introduced mathematical methods into electrical engineering, making it possible to create electric machines not on the basis of empiricism, but due to mathematical evaluation of physical phenomena.

Keywords: history, electrical engineering, Lachinov, electricity transmission via wires, electric machines, generators, engines, batteries for submarine fleet.

Railway Freight Tariffs: History and Modernity

Macheret D. A.

Pp 252 – 256

Khusainov, F. I. Pricing in Railway Transport. History of Rail Freight Tariffs in Russia: textbook. Moscow, MGUPS publ., 2017, 102 p.

The training manual presents a retrospective of tariffs from the inception of the railways in Russia until 2015. The book analyzes all tariff reforms, the principles of building tariffs, their structure, the reasons for changing tariff-setting models, tariff discussions of scientists from different schools. From the book it becomes obvious that the basic principles that have existed for more than a hundred of years, do not lose their relevance today. Economic science and tariff practices are constantly returning to old discussions. Therefore, a competent specialist in the economics of rail transport should have an idea of the main problems of evolution of railway tariffs.

Keywords: railway, freight tariffs, unregulated and regulated tariffs, pricing, tariff reform, tariff discussions, solvency of cargoes.