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On Construction of an Intelligent Subsystem for Analyzing the Parameters of a Marshalling Hub

Gridin V. N., Doenin V. V., Panishchev V. S.

Pp 6 – 19

The article considers the issues of continuous monitoring of the situation at the marshalling yard and detection of the possibility of occurrence of dangerous situations. An approach is proposed for constructing an automated intellectual subsystem for analyzing and timely forecasting the critical utilization of railway sorting units. The solution of the problem is proposed with the help of network communication technologies due to the use of information from automated data collection systems and the neural network decision support subsystem.

Keywords: transport, intelligent system, system analysis, forecasting of critical situations, simulation modeling, sorting node, neural network, information, communication technologies.

Experiment and Theory: Distribution of Characteristics of Car Motion

Ogorodnov S. M., Maleev S. I.

Pp 20 – 33

The main factor that forms the perturbation, acting on the car in operating conditions, is the speed of movement. Analytical studies of operational properties and reliability indicators are based on the characteristics of traffic – distribution of runs and speed, in some cases obsolete, or incomplete and not correlated with the characteristics of the macro profile of traffic routes. The data on research of characteristics of the macro profile of country roads of the central Russia are given, their classification is offered. Stationary arrays of random values of relative mileages are allocated and the approximation of random speed distributions by analytic dependences is performed. The obtained results allow to simulate the car movement at early stages of design works and to improve the accuracy of the evaluation of parameters and characteristics studied.

Keywords: car, perturbation, macro profile, analytical studies, theoretical methods, experiment, approximation, distribution, mileage, speed, projection, motion model.

Solution of the Transport Problem by the Method of Successively Decreasing its Dimension

Ivnitsky V. A., Makarenko A. A.

Pp 34 – 41

The article considers the solution of the transport problem in two ways: by the method of the north-western angle and the method of the minimal element. As a result of the analysis, it is proved that the minimal element method allows to reduce the number of iterations by several times. In solving complex problems of large dimension, the choice of a rational method plays a decisive role, which is demonstrated by the method of successively reducing this dimension by means of the algorithms used to optimize the distribution of shipments of goods.

Keywords: transport problem, logistics, optimization, programming, decision methods, dimension, algorithms.

Formula for Calculating the Restoring Force for Wheels with a Curvilinear Profile

Korolkov E. P., Ivanova A. A.

Pp 42 – 48

A method is proposed for calculating the restoring force of a wheel set using wheels with a curvilinear profile having a parabolic shape. The corresponding mathematical calculations are made. The results of the calculations showed that the application of the curvilinear profile increases the restoring force compared to the wheels having a conical surface. Simultaneously it was established that the restoring force plays the role of elastic force.

Keywords: wheel set, restoring force, calculation method, mathematical model, wheel profile, curvature, cone.

Covert Channels of Information Transfer

Alekseev V. M.

Pp 50 – 56

The article deals with the organization of hidden channels of information transfer with the help of embedded agents in operating systems. The current state of research in this field of science, comparison with the world level, shows that there are no theoretical developments of hidden channel analyzers, as well as software and hardware implementation of their models. The author offers his approach to creating covert channel analyzers based on methods of self-organization, as well as an

algorithm for network operations that allows to perform the functions of entanglement of packets in order to destroy the process of transmitting information over hidden channels.

Keywords: information channels, corporate network, hidden channel, analyzer, secret agent, packet, perceptron.

Reliability Functions of Electromechanical Power Steering

Denisov I. V., Smirnov A. A.

Pp 58 – 69

The vast majority of new cars are equipped with electromechanical power steering (EPS) because of its clear advantage as compared to hydraulic and pneumatic devices. At the same time, the question of the technical operation of the unit has not yet been fully studied, as the combination of electronic and mechanical systems in which does not allow the full use of existing methods and means of monitoring operability of a vehicle, its actual technical condition. In this regard, development of standards for control over a technical state on the basis of diagnostic information, systematization of scientific achievements in this field, the problems of increasing reliability of EPS in operation are particularly relevant. The results of the conducted research will help in creation of a method for controlling reliability of the unit.

Keywords: car, steering, electromechanical power steering, technical state control, reliability, operation.

Study of Roadbed Stress State from the Impact of Freight Cars with Axle Load up to 30 tnf

Kossov V. S., Krasnov O. G., Protopopov A. L.

Pp 70 – 91

The stress state of the active area of the roadbed caused by the impact of freight cars with axle loads 23,5; 25; 27 and 30 tnf is studied on the basis of a finite-element model. Using Coulomb's wedge theory as per actually registered vibration impact levels, limit stress levels for the embankment of the roadbed of the section Golutvin–Ozery of Moscow railway have been determined. Experimental studies to determine stresses on the main site of the roadbed have been conducted and design and experiment data have been verified.

Keywords: stress state, roadbed, freight car, high axle loads, limit stresses; humidity, vibration impact.

Coefficient of Motor Vehicle Technical Efficiency: Modeling and Calculation

Goncharov O. Yu.

Pp 92 – 101

The purpose of the research presented in the article is to refine the vehicle's technical efficiency coefficient and to estimate the range of its values in the proposed design model, taking into account the different variants of configuration of cars of the same brand and under different driving regimes. The modeling schemes used and the evaluation criteria are based on the data of the author's scientific analysis and are supported by practices.

Keywords: vehicles, coefficient of efficiency, coefficient of technical efficiency, calculation methods, numerical modeling.

Estimation of Foundation Settlement on Weak Base Sections

Ulanov I. S.

Pp 102 – 108

In the development of embankment projects on a weak base (water-logged clay soils), the correct estimation of the size of the embankment settlement and broadening of the main site of the roadbed are of current importance. The article offers the author's analysis of the condition of the roadbed of the Naryn–Lugokan railway line, taking into account the presence of island permafrost, the specified operational characteristics, the geodetic survey data and the scientific and theoretical substantiations of the project.

Keywords: railway, operating settlement, building settlement, weak foundation soils, permafrost, operational problems, site broadening

Features of Development of National Seaports

Soliakov O. V., Izotov O. A., Yakunchikov V. V.

Pp 110 – 121

The problems of the activities of national seaports and port logistics, issues of intermodality of transportation are considered. The discrepancy between the world practice of the regime and the procedures of operation of border checkpoints and customs, the absence of generally accepted tax and customs preferences abroad, including the creation of port special economic zones, continues to considerably influence transport and logistics business activities. It is shown that the basis for assessing the level of competitiveness in transport is the transition of the profitability

point from the processes of physical transportation or cargo turnover to the area of transport and logistics services. Accordingly, various systems of criteria for the «attractiveness» of the seaport are applied. An integral row of such indicators-criteria for various conditions, goals and participants in the transport process is proposed. Among the prospects for development of seaports in the European part of Russia, the authors emphasize the option of combining all four modes of transport in the agglomeration of one port, which can dramatically increase its demand as an inter-regional transport hub.

Keywords: economy, logistics, seaports, export, cargo transportation, intermodality, world market, competition, border checkpoints, customs.

On Improvement of Planning of Stocks of Material and Technical Resources

Valenteichik A. G., Belkonsky V. V.

Pp 122 – 127

The relevance of the article is justified by the need for in-depth theoretical and applied research related to creation of an integrated system for planning and controlling of resources, improvement of the material and technical supply of railway enterprises. The object and area of research is the subsystem of material-technical supply at the operating domain of Kuibyshev Railway in the system of economic management of JSC Russian Railways. At the same time, the improved methodology for calculating the standard of production stocks is demonstrated, which excludes unreasonable decentralized purchases, reduces maintenance of inventories, operational costs of accompanying supplies of material assets, as well as operational, depreciation and tax expenses of the regional departments of Samara Directorate of Material-Technical Supply.

Keywords: railway, material and technical supply, planning, methodology for calculating the standard of production stocks, intra-industry reserves, spending limits, economic efficiency.

Convertible Flows and Values in Supply Chains

Tyapukhin A. P., Tarasenko E. A.

Pp 128 – 144

The article substantiates the stages of divergence of value management in supply chains, a sequence of formation of the final consumer’s relation to the acquired and used value is developed, a methodical approach is proposed to transform the flows of products and services into value flows. The purpose of the research is to clarify the essence of the value of the final consumer of products and services that are the subject of marketing research, and also the formation on this

basis of necessary prerequisites for adjusting the theory and the methodology of logistics as a concept of enterprise management.

Keywords: value, flow, final consumer, logistics, divergence, supply chain, transformation.

System Analysis and Modeling of Transport and Passenger Flows

Maslov E. S.

Pp 146 – 151

The article analyzes approaches to modeling of transport and passenger flows for optimizing and improving the efficiency of functioning of existing routes and interchange nodes. A technique for estimating traffic flows in a large city system based on a transport model is presented. Key indicators to provide interaction in the process of control of transport and passenger flows are identified. A systematic approach is described in analyzing the possibilities of integrating parts (elements) of an intelligent transport system.

Keywords: intelligent transport model, system approach, transport flow control, passenger flow control, optimization, information model, interaction of transport and passenger flows.

HSR-2 and Modernization of Transport and Logistics Systems of Megacities

Davletshin T. G.

Pp 152 – 163

The topic of the article is the influence of HSR-2 Moscow–Kazan–Yekaterinburg on transport and logistics systems in megacities and large urban agglomerations along the route, on town-planning development concepts. The complex modernization of the transport frame of urban agglomerations in the construction of a high-speed highway can solve the transport problems that have accumulated over the centuries, positively affect the spatial and territorial development of cities, increase the efficiency of investments, and give a reasonably expected synergistic effect. Moreover, they may require even less money than planned at the construction stage (although this is not an end in itself), and the economic effect in the operation of high-speed railways, urban and suburban transport, promises to be higher than planned, and this opens up new prospects for the spatial and territorial development of towns and agglomerations located near HSR.

Keywords: HSR-2, megacities, agglomerations, international transport corridors, transport and logistics systems, mutual influence, tracing, long-term effect.

Basics of Building a Sectional System of Track Current Maintenance

Karpushchenko N. I., Bystrov A. V.

Pp 164 – 177

The current maintenance of a track in its essence is a struggle against the process of continuous accumulation of residual deformations and requires mobile control, professional readiness. Therefore, the work force capacity, organization of labor must meet the set tasks and conditions. The introduction of a sectional system of track maintenance, new technologies, automated complexes of track machines compels to revise the standards of track maintenance, the better use of production resources.

Keywords: railway, track current maintenance, sectional system, organizational structure, number of track servicemen.

Organization of Car Flows in Market Conditions

Levin D. Yu.

Pp 178 – 192

In market conditions one of the former main criteria of the system of organizing car flows, which was reduction in the turnover time of cars, has lost its relevance. Now it is necessary to abandon the evaluation of the variants of the train formation plan using costs calculated in reduced car-hours. Therefore, as a replacement, it is offered to fulfill the delivery deadlines. At the same time, in conditions of the privatized car fleet, a combination of criteria for meeting the deadline for the delivery of goods and minimizing the processing of car flows at technical stations was required. In the process of calculating the plan for the formation of one-group trains, all streams of car flows, from the furthest ones, are consistently considered. If the accepted conditions are not met, the procedure of combining distant ones with shorter streams with their processing at one, two, three, etc. stations is performed – until the proper level of organization is achieved.

Keywords: railway, train formation plan, design norms, combinatorics, terms of cargo delivery, organization of car flows.

Optimal Location of Rescue Service

Gusev A. I., Gusev S. A.

Pp 194 – 201

In papers (1–4), the problems of optimal location of a highway, optimal distribution of means between programs for traffic safety in transport are

investigated. The article suggests a model for location of the car fleet (automobile fleet) in its dynamics and investigated the problem of optimal location of the rescue service on the highway in the best possible way if there are several transport nodes thereon. Model calculations can be used both for practical purposes and for further theoretical studies.

Keywords: safety, transport, normal distribution law, Laplace function, transport node, optimal location, rescue service.

Accident Rate and Victims of Road Traffic in a Big City

Volchatova I. V.

Pp 202 – 213

Based on the statistics of road accidents, an analysis of accident and injury rates on the roads of Irkutsk was carried out. It is shown that, for the most part, the causes of road accidents are violation of traffic rules by drivers and pedestrians, unsatisfactory road conditions. It was revealed that the greatest number of accidents occurs in the summer-autumn period. Most often, vehicle collisions and pedestrian collisions are recorded. About 40 % of road accidents with victims are committed in the foci of accident rate, the distribution of which directly depends on density of settlement of the territory and the functional specifics of the city's administrative units.

Keywords: motor transport, road traffic accident, accident rate on roads, foci of accident, severity of accident consequences, road safety.

Aerospace Emergency Monitoring Methods

Zheleznov M. M., Ponomarev V. M.

Pp 214 – 227

The article provides a comparative analysis of natural and man-made factors that lead to the occurrence of emergency situations on railway transport. The issues of information and technological support of monitoring and data collection about the state of potentially dangerous sections of the railway track using aerospace technologies are considered.

Keywords: aerospace monitoring, railway track, safety, emergency situations, control technologies.

Rational Choice of Vibration Protection Parameters of the Metro Track

Titov E. Yu., Kharitonov S. S.

Pp 228 – 235

In the article the questions connected with the choice of rational parameters of the vibration protection structures of the metro t rack superstructure are considered. Results of an assessment of ways to increase the efficiency of vibroprotective properties of blocks LVT-M are given. Proposals are made to improve the methodology for such an assessment, which should take into greater account the deformation characteristics of the track, the structural features of the tunnel and other structures in the metro zone. Particular emphasis is placed on the importance of using materials which dynamic stiffness is slightly higher than the static in the range of the studied frequencies of 2–63 Hz.

Keywords: vibration protection, track superstructure, metro, track stiffness, vibration isolation efficiency.

Memories of a Former Steam Locomotive Fireman

Kurbatsky E. N.

Pp 238 – 248

The author of the article has been dealing with transport underground facilities for a long time; in particular, he studies the «behavior» of tunnels in zones of seismic activity. But professor Kurbatsky began his work as an ordinary fireman at a locomotive furnace. Today, very few people know about the intricacies of this profession, without which no railway train, headed by a locomotive, could do. The work of a fireman required very good physical training and skill. In addition to the constant casting of coal into the furnace, the fireman had to take a staff at each station. This procedure ensured the presence of only one train at a station. Sometimes this was done at full speed. At all stops at any time of the day a fireman was obliged to lubricate axle boxes with fuel oil, to fill a locomotive with water. About this first and distant stage of his railway life, the current doctor of science recalls with particular warmth, as it should be for a hereditary transport worker.

Keywords: history, railway, steam locomotive, staff, axle box, fireman, memories.

Cross-Border Infrastructure

Litvinenko G. I.

Pp 254 – 256

Russian borderlands: socio-political and infrastructure problems / Ed. by V. A. Kolosov and A. B. Volodin. Moscow, 2016, 188 p.

The collection includes materials from All-Russian Scientific and Practical Conference «Cross-Border Infrastructure of Russia», organized in February 2016 at the initiative of the Institute of Geography of the Russian Academy of Sciences, the Agency for Development of Cross-Border Infrastructure and Moscow State Academy of Water Transport. The publication consists of two sections, which present the results of studies by geographers, economists, sociologists on economic, sociocultural, infrastructural problems of the borderland, as well as development and operation of cross-border infrastructure and transport.

Keywords: «Economic belt of the Silk Road», international logistics, state border, transport, cross-border infrastructure.