

EVALUATION OF TRACK'S VIBRATION AT HIGH SPEED

Kogan, Alexander Ya., Poleshchuk, Irina V.

pp. 6 – 15

This article proposes an analytical method of assessment of track's vibration level, based on the spectral decomposition of functions of sleeper deflections under the influence of passing axles of rolling stock. Train is considered to be formed from vehicles of the same type and of unlimited length. Vibrations are studied within a stable system of coordinated, related to the ground, for one sleeper during the passage of a train of unlimited length through track's cross-section. The computational scheme takes into account vibration damping of a track, considered as an infinitely long beam on a viscoelastic foundation. The algorithm and the results of numerical calculation of track's vibration are given at speeds in the area of conventionally critical speed (the speed at which the model that does not take into account energy dissipation on the way predicts vibrations of unrestricted amplitude). It is shown that when the train's speed is equal to conditionally critical (of about 500–600 km /h), the track's vibrations reach their peak in the whole frequency range. Results are obtained for a wide frequency range from 16 to 32000 Hz in 12 octave bands in decibel scale. Methods, outlined in this article, make it possible to solve problems of accumulation of residual track's deformations, as well as give direction for solving problems associated with the vibrations of the roadbed.

Keywords: railway, sleeper's vibration, high-speed trains, critical speed, frequency octaves, spectral density, decibels, analytical method, numerical calculation, Hurwitz criterion, Fourier transform.

MULTIWIRE AC ELECTRIC TRACTION NETWORKS

Chernov, Yuri A., Gavrilov, Maxim S.

pp. 16 – 23

The article describes a method for calculating current distribution in wires of multiwire AC electric traction network. Formulas for determining the resistance of one track of a multiwire electric traction network of a double-track line and mutual resistance of wires of two tracks with account of induced currents in the wires of the second track are proposed, enabling in the calculation of modes of power supply to use the software for a25 kV system. The resulting equations, referring to the conditions of electric traction network with screening and reinforcing wires provide

an opportunity to apply them in exclusion of any wire or several wires of available multiwire complex.

Keywords: railway, multiwire electric traction network, AC, resistance of wires, current distribution, calculation methods, mathematical apparatus.

ON THE LAW OF PROBABILITY DISTRIBUTION OF A RANDOM VARIABLE

Zotova, Marina A.

pp. 24 – 31

The article provides a study on probability distribution of a random variable at the example of response time to enquiry within the data processing center (hereinafter- DPC), considered as a queuing system. To solve this problem the author examines the hypothesis of an exponential distribution, uses in the study queuing theory and simulation methods. The results obtained provide a well-founded guidance to DPC users and ability to correlate computed values with existing standards and growing needs of information system's users.

Keywords: queuing theory, probability theory, data processing center, probability distribution of random variables, response time, simulation.

SIMULATION SYSTEM OF NETWORK DATABASE MANAGEMENT SYSTEM WITH LIMITED CIRCULATION OF SEGMENTS

Safonova, Irina E., Goldovskiy, Yakov M., Zhelenkov, Boris V.

pp. 32 – 44

Development and modernization of databases often involve simulation stage. Simulation of distributed databases is of particular interest and it should take into account the peculiarities of the exchange of data between network nodes.

Simulation system, which is considered in the article, makes it possible to analyze processes occurring in the network database management system with limited circulation of segments.

Keywords: information, database management system, system performance, circulation of segments, simulation.

TROUBLESHOOTING OF TRANSVERTER OF ELECTRIC TRAIN UNDER OPERATION CONDITIONS

Kostyukov, Vladimir N., Tsurpal, Alexey E.

pp. 46 – 53

The authors assess the existing system of operation and maintenance of railway rolling stock in Russia; identify its main disadvantages and challenges. They argue that it is crucial to organize reliable monitoring of technical state of the most critical equipment. Following the description of the features of transverter of electric train, they suggest a method of its troubleshooting which is based on monitoring of parameters of spectrum of threephase alternating current. The method refers to both operational and pre-accident conditions of devices.

Adequacy of the procedure is tested and confirmed on the basis of data obtained during the operation of the experimental plant.

Keywords: electromotive, technical diagnostics, troubleshooting, transverter, imbalance, AC spectrum, on board monitoring system, experimental plant.

PERFORMANCE OF RIGID PAVEMENT IN PLANES' LANDING AREA

Nazarov, Viktor V.

pp. 54-59

As it is shown by experimental studies, variable vertical loads acting on the pavement of the airdrome are random in nature. In this regard, to assess the reliability of pavements calculation method is necessary, bonding characteristics of the random loading process with the simplest fatigue behavior – Wohler curve. The article proposes methods providing for determining the design life of pavement in planes' landing area within the parameters of the foundation material and the impact of the loading dynamics of airdrome pavement. This makes it possible to properly assess structural life of the pavement in the design process, and to ensure optimal conditions of its operation by controlling the amount of landing operations of calculated aircrafts from different runway headings.

Keywords: airdrome, operational cycles, «mat- ground» system, runways, performance, rigid pavements, calculation model.

OPERATIONAL RELIABILITY OF PASSENGER STATIONS

Kubrak, Alexey A.

pp. 60 – 65

The article raises the problem of the need to define the impact of organizational-technical failures (in operational work, presented in the form of delays incurred in handling of trains and during processing of trains) on the reliability of operations of passenger stations and coach yards. The author identified the necessity of analysis of operation of these stations, on the basis of a table proposed by the author and entitled «Delays of trains classified into elements of the technological cycle of formation and turnaround of passenger trains resulting from failures of various kinds in subsystems of a passenger station and a coach yard».

Keywords: rail transport, passenger station, coach yard, field operation, reliability, failure, spreadsheet analysis.

DESIGN OF AN ELECTRIC LOCOMOTIVE WITH A ROTATING FRAME

Zolkin, Alexander L., Fisyurenko, Roman V.

pp. 66 – 74

The authors consider problems of reducing travel time and energy saving in the operation of rolling stock. The developed design makes it possible for an electric locomotive to move to an adjacent track and to move in the opposite direction on a parallel track to the point of formation. This saves time of locomotive stay on the track, the amount of electricity needed to go to a nearby station and back, and also minimizes the duration of overlapping of the section of the track for maintenance work, because after the completion of works an electric locomotive moves to the adjacent track and the section becomes open for traffic.

Keywords: electromotive, rotating frame, railcar, new design, durability, movement between tracks.

PRIORITIES OF CHINESE SPEEDS

Karapetyants, Irina V., Sazonov, Sergey L.

pp. 76 – 87

Dynamic and systematic economic and technological growth of China's economy at the beginning of the XXI century largely predetermined scale

investments in transport infrastructure, primarily in the construction of high-speed rail (HSR). Mobility of population increases, travel time of cargo and passengers reduces, mobility speed becomes record, recently remote areas obtain access to the center part of the country. The authors analyze and summarize the current trends in transport market, assess existing competitive advantages of HSR, financial problems of existing programs and the reformist course that China's leadership provides for the modernization of the railway complex.

Keywords: rail transport, China, reform, high-speed trains, high speed rail, investments, economy, competition.

MULTIMODAL NETWORK OF KAZAKHSTAN: DESIGN OF A STAGED DEVELOPMENT

Kenzhebayeva, Gaukhar Z. (Almaty, Kazakhstan), Badambayeva, Saltanat E. (Almaty, Kazakhstan)

pp. 88 – 97

Relevance of interaction problems between rail and sea transport is primarily connected with market environment of the economy, competition, tariff policy, investment resources. In Kazakhstan, due to the presence of sea port Aktau and two international transport corridors passing through the country principles of multimodality acquire a special meaning and are implemented using logistic resources and development of design methods of integrated staged development of multimodal network, including effective alternatives providing for the situation when the shape and capacity of the current system are changing. The authors substantiate three stages, which are of strategic importance for national and regional economics.

Keywords: multimodal transport system, railway, seaport, transport and logistics center, economy, competition, technical and economic parameters, field of effective alternatives, staged development.

CROWD FUNDING AS A STRATEGY OF INVESTMENT IN INNOVATION

Tegin, Vladilen A., Usmanov, Boris F.

pp. 98 – 106

Becoming one of the ways of voluntary financing of innovative projects through Internet networks, crowd funding gradually attracts Russian backers- people who invest private money to create new products, which are in demand by business and society. An investment pool has been formed, which is flexible in its interests and choice of creative ideas, which serves market demands and is capable of

promoting the implementation of crowd funding campaigns in any sphere of life, including transport. Examples of such inclusiveness of target networking platforms, cited by the authors, and an overall assessment of established practice emphasize economic sense and undoubted business benefits of crowd funding. The investment strategy of corporations, as well as of representatives of small and medium business in Russia should make full use of new financial resources.

Keywords: investment, innovation projects, Internet networks, voluntary funding, crowd funding, business.

PLANNING OF DEVELOPMENT OF ROAD NETWORK BASED ON CLUSTER ANALYSIS

Komarov, Constantine L., Zykova, Valeria Yu., Kuzmitskaya, Maria A.

pp. 108 – 117

The object of research is existing and promising road network of areas that are parts of Novosibirsk agglomeration. Method of cluster analysis provides an objective assessment of road construction projects, their socio-economic relevance to local conditions and opportunities. A program of automated calculation of stable clusters is offered. Within the planning of transport systems development in the region approaches are developed to justify priority construction of roads and road structures of public service of regional and intermunicipal significance with account of socially significant economic effects.

Keywords: transport, region, cluster analysis, hierarchical cluster analysis, roads, road network, development planning.

INTEGRATION OF REGIONAL TRANSPORT COMMUNICATIONS

Mirotin, Leonid B., Lebedev, Evgeny A., Levitsky, Mikhail O.

pp. 118 – 122

A variant of the integration of international transport and transport-technological system of Southern Federal District is proposed with account of development strategy of inland water transport of Russia until 2030. Alternative directions of traffic and transshipment of containers are shown using the example of containers of «river-sea» type and economic effect of their use subject to ports and enterprises of Southern Federal District is calculated. The article highlights perspective of transport and logistics service of transit, outbound and inbound freight flows in the presence of state-controlled single control center that has regional branches.

Keywords: water transport, multimodal transport, infrastructure, region, integration, transport system, terminal, container, bulk carrier.

SIMULATION OF PASSENGER FLOWS IN TRANSPORT INTERCHANGE HUBS

Vakulenko, Sergey P., Doenin, Viktor V., Evreenova, Nadezhda Yu.

pp. 124 – 131

The authors consider a descriptive part of passenger flows simulation in a transport interchange hub, which takes into account the logical dependencies in organizing relocation of passenger flows, individuals and groups. All possible types of operations observed in the simulated space and assuming the reaction of control devices are shown and get their own interpretation. Different complexity of the situation with the organization of passenger traffic is estimated given architectural and planning decisions and the size of the complex.

Keywords: transport interchange hubs, passenger transportation, mathematical modeling, passenger flows, passenger behavior logic.

«URBAN TRAIN»: IS IT TIME TO TALK?

Orlov, Vitaly A. (Minsk, Belarus)

pp. 132 – 140

Specialists have not yet finally decided on reasonability to use railway spurs which pass through the major cities for local passenger transportation. The problem of this kind exists in Moscow and other Russian cities. In this article the author raises a problem of «urban train» in Minsk, capital of Belarus, where passenger lines and related infrastructure have been formed. And this is done in accordance with the strategy of urban transport network development in coordination of different types of transport routes and passenger flows, which meet the needs of the population. The author polemically sharpens the subject and raises questions, which are quite crucial for the present day.

Keywords: urban transport, suburban-urban communication, urban sections of railways, combined routes, passenger traffic, coordination of transport modes.

ON IMPROVING THE QUALITY OF MATHEMATICAL KNOWLEDGE

Vinogradov, Valentine V., Kochneva, Lyudmila F., Platonova, Olga A.

pp. 142-147

Decline in the level of mathematical knowledge at school, along with a general deterioration of competences of prospective students entering technical higher education institutions exacerbate the quality of acquisition of knowledge in engineering disciplines. Lecturers of Mathematics and Physics departments of MIIT in cooperation with the schools of North-East Administrative District of Moscow created a program of additional study of mathematics, which is designed to reduce the gap between the current level of school training and requirements of higher education institutions to newcomers, beginning to study at universities. The article presents the first results of a promising cooperation.

Keywords: education, higher education institution, school, mathematics, quality of education, joint program, innovative approach.

COMPETENCE OF CORPORATE MANAGERS IN THE SPHERE OF HRM

Arkhangelskaya, Oksana V., Glazkov, Vladimir N., Arkhangelskaya, Oksana A.

pp. 148 – 153

The article provides an analysis of the following issues: what competences a leader should have for solutions of a totality of tasks at hand, for innovative development of professional capacity and creativity, increase in performance and effectiveness of production activities.

Keywords: management, personnel, leader, competences, development of management and professional skills.

SYMBOLS OF A UNIVERSITY IN THE PERCEPTION OF STUDENTS

Vorontsova, Natalia N.

pp. 154 – 158

The author highlights a topical issue for the communicative space of an educational brand. Alma mater symbols play identification, programming and cognitive role in the involvement of the students. Young people perceive through these

symbols their belonging to a socially significant group, adapt to a certain selfprogramming using visual sense from the proposed images. It represents further personal development, future profession. This means that the symbols can communicate between educational brand and personality of a student.

Keywords: higher school, higher education institution rating, educational brand, competitiveness, identification branding, corporate identity, social integration, communication.

METHODOLOGY OF THE STUDY OF TRANSPORT MACHINERY HISTORY

Bolotin, Mikhail M., Andriyanov, Sergey S.

pp. 160 – 169

The article reveals methodological approaches to the study of history of production and cars machinery. The basic concepts of production and transport machinery, machines and tools, as well as the principles and methods of the study of history are described. Particular attention is paid to the periodization of historical and technical processes and experiences in applying chronological and chronological-problematic principles. In addition, the authors consider logical method, historical method, mathematization and modeling method. A generalized principle of links-substitution for periodization of technology development processes is offered. A new category is introduced – the level of intelligence of automatic machines, the method of its quantitative assessment is mentioned.

Keywords: history, cars, locomotive, production machinery, methodological approaches, principle of historicism, substitution principle, principle of links of machines, generalized principle of links- substitution, periodization of history of technology, method of mathematization, level of intelligence of automatic machines.

TRANSPORT DENTISTRY: A HUNDRED YEARS AGO

Gonchar, Vladimir V.

pp. 170 – 181

The author assesses the situation with transport medicine in the Far East region in the early decades of the twentieth century. The article provides an analysis of trends in the organization of health care, statistics and historical data describing medical assistance on the railways and water transport. First of all the author refers to health and socio-economic problems of dental practices in the period of the Soviet regime in the eastern regions of the country (1922–1927). The experience of those years to a certain extent is projected onto the present time, offering own formulas for

«treatment» of stagnant social ailments, e. g. whether departmental railway medicine is useful or harmful to the population.

Keywords: history of medicine, transport medicine, dentistry, the Far East, railways, social insurance.

THE TOOLS ARE CHANGING, WHILE FUNDAMENTALS ARE UNCHANGEABLE

Rakhimyanova, Irina A.

pp. 186 – 190

THE REVIEW OF THE BOOK:

Gorin, B.S., Makharev, E.I., Persianov, V.A., Stepanov, A.A., Surikov, R. T. Sales of services: passenger transport. Educational guide. Moscow, Student publ., 2014, 423 p.

ABSTRACT OF THE TEXTBOOK.

The educational guide presents fundamentals of sales of passenger transport services on the basis of modern methods of organization and management, system of transportation documentation, automated systems of booking and mutual payments. The state of transport complex of Russia, nature and characteristics of production of passenger transport, types of sale's guarantee are described: organizational and functional, regulatory, informational, technological, management- guarantee and security sales guarantee. Much attention is paid to forms of electronic tickets and electronic multi-documents, e-document execution of selling services and e-commerce. General framework for each section is accompanied by explanations of specifics, taking into account the specifics of a particular mode of transport, as well as examples of numerous practices, test questions and references. For students of higher education institutions enrolled in the program of training of specialists in management (qualification «bachelor»). It may be useful for preparation of Masters and Ph.D. students, and employees of all modes of transport in their business activity and professional development.

ABSTRACT OF THE REVIEW.

Designed primarily for students of higher education institutions, this book contains fundamental and systematic materials on the organization of sale of services and management of passenger transportation market. It presents all types of land, air and water transport, and their commercial activities are considered in the context of network electronic communications, multidimensional competitive environment, marketing technologies. The structure of the educational guide meets program directions of the course «Management» (bachelor degree course), includes test questions for each of eleven chapters, tables and illustrations that help the disclosure of the topic. An important place is given by the authors to regulatory (including international) security of vendors and users of transport services relations, customer focus in politics of passenger companies.

Keywords: passenger transport, sale of services, management, marketing, tariffs, e-commerce, e-payments, market, competition, higher school, bachelor degree course, education program.