

Methodological Approaches to the Nature of Sectoral Tax Benefits

Lavrentieva, Elena A.

Pp 6 – 15

The article considers significance and systematizes development of sectoral tax benefits in market conditions, studies common scientific approaches there-to, justifies interrelationship of key principles of taxation and sectoral tax benefits. The importance of the topic for transport sector is highlighted. The author's interpretation of the essence of the concept «sectoral tax benefits» is offered through assessment of regulatory function of taxes and their role as of a form of budget expenditures. A tiered approach to legal regulation of sectoral tax benefits is substantiated. The author puts forward theoretical basis of classification of proposed concept, as well as criteria for selecting sectors and types of business activities for which it is advisable to set benefits in taxation. A general algorithm for calculating financial and economic impact of sectoral tax benefits is proposed.

Keywords: transport, benefit, tax, theory, methodology, concepts, essence of sectoral benefit, classification, efficiency, consequences calculation algorithm.

Technological Properties of 3D Station Engineering Model

Golovnich A. K.

Pp 16 – 29

Relying on alleged conceptual basis for development of model samples of railway stations in the three-dimensional format (see World of Transport and Transportation, Vol. 14, 2016, Iss. 1), the author highlights important, in his view, technological guidelines and locations. The research is essentially focused on peculiarities of construction of an engineering model, correctly reproducing technology of 3D station operations and basing on reconstruction of consequences of physical laws acting in the real world.

Keywords: railway, station, design, engineering 3D model, localization, information technologies, physical laws, consequences reconstruction.

Calculation of Traction Current Harmonics' Influence on Track Circuit

Antonov A. A., Bakin M. E.

Pp 30 – 36

Track circuits, as well as other elements of railway automation, are in the zone of influence of electric rolling stock and, in particular, of traction current. In terms of electromagnetic compatibility this is an area of risk that requires specific tools of study and control. Mathematical description has been developed to calculate the influence of harmonics of traction current, flowing in the contact wire of adjacent track of double-track sections, and of its harmonic components, on track circuits. Equivalent circuit and system of differential equations are shown, which are designed to solve problems to ensure operational reliability of a railway line.

Keywords: railway, electromagnetic compatibility, mathematical description, track circuit, traction current harmonics, contact wire, adjacent track.

Catamaran in High Speed Context

Lebedeva M. N.

Pp 38 – 47

The article presents the results of development of high-speed catamaran vessel of large cargo capacity with minimal environmental wave load on river channel intended for joint operation within the supply chain together with road transport. Conditions for model testing, comparing waves caused by river cargo vessels of various types are described. The results of measurements of prototype's impact and expansion of parameters of considered waves for calculation of intended model of a real vessel are given.

Keywords: inland water transport, catamaran, river, channel load, logistics, clearance, compatibility, road transportation.

A Method for Train Weight Estimation

Dubrovin L. M., Nikishechkin A. P., Davydenko V. I.

Pp 48 – 55

There are difficulties and deficiencies in procedures of weighing of railway cars and trains, as well as there is a persisting need to know cargo loads on the rail track. The article offers a simple way to estimate weight of a train as it moves along a control track section. It is based on measurement of intensity of magnetic field generated by locomotive DC traction motors. The role of weighing devices is performed by ferroprobes having as recording devices milliammeters with a

calibrated scale for measuring train weight. The results achieved by the authors confirm method's effectiveness.

Keywords: train weight, locomotive, DC traction motors, constant magnetic field, magnetic field intensity, ferroprobes, train weighing method.

Method for Improving Selectivity of Signals in Radio Communication

Volkov A. A., Morozov M. S.

Pp 56 – 63

Taking into account the characteristics of railway radio communication a precision wideband phase shifter to 90° for an intermediate frequency signal is offered. A phase preselector of a receiver, combined with its frequency converter, is developed, allowing to further increase selectivity of adjacent and image channels, as well as sensitivity of a receiver while simplifying its structure. The results of calculations of structural elements and transmission of signals in the range of radio frequencies used are shown.

Keywords: railway, radio communication, receiver, selectivity, sensitivity, image channel, adjacent channel, wideband phase shifter to 90° , frequency response, phase response, phase preselector, stability gain.

Wind Power Station Model with Load Variable in Time and Space

Epshtein G. L., Sytov E. S.

Pp 64 – 73

The article presents the results of development and research of a mathematical model of wind power station connected to the electric system and multi-level, mobile load. It is assumed that the load is variable in time and location. The response of the system to various perturbations is studied, the technique of selection of parameters for automatic control of external rotor resistance is considered, the necessity of introducing a voltage stabilization circuit is justified. The advantages of the power supply circuit using a wind power station in the presence of wind power fluctuations are shown.

Keywords: wind power station, asynchronous generator, mathematical model, mobile load, recuperation.

Nanomaterials and Optoelectronics in High-Speed Communication Systems

Zhuravleva L. M., Malykh A. N., Malykh A. N.

Pp 74 – 80

The article considers issues concerning increase in capacity of fiber-optic systems used on railways. The main directions of increasing information transmission speed are reviewed and analyzed, particularly enhancement of high-speed response of optical modulators and photodetectors through improving functional environment of optoelectronic devices and reducing inertia of the material. For this purpose, new materials are proposed in the form of multilayer nanostructures, along with manufacturing techniques and methods of assessing their quality characteristics required for design of new optoelectronic devices, that will positively affect railway communication systems' performance.

Keywords: railways, communication channels, information network, isotope effect, bandwidth, nanostructure, fiber-optic system, optoelectronic devices.

Transport Aspect of Roundabout Production Methods

Macheret D. A.

Pp 82 – 89

The essence of roundabout methods of production, according to the author, is that the ultimate goal of the process, which is to provide consumer goods, is achieved through creation and sales of intermediate products, which are capital. The use of such techniques improves efficiency of production, so the growth of «roundaboutness» is a dominant trend of economic development. The specifics of transport aspect in this case is the fact that transport connects various stages of production chain, located at different points in space, and thus has spatial roundaboutness effect, which is the most pronounced in today's global economy. The effectiveness of development of global economic production chains increases with the absence of barriers to movement of goods, capital and labor and with availability of mar

Keywords: transport, roundabout production, spatial roundabout effect, capital, global economy.

Service Market as an Integration Platform for Logistics Companies

Freidman O. A.

Pp 90 – 101

Uncertainty and the risks inherent to market processes increase the need to unite efforts of the actors, to strengthen inter-territorial and inter-industry linkages. In the market of transport and logistics services the on-going integration is accompanied by creation of logistic clusters and investment planning in the framework of joint projects regarding construction of transport and logistics structures. The relevance of research of market of transport and logistics business is conditioned by a need to

improve coordination of activities of companies-contractors and development of cluster strategies for their development using virtual networking opportunities. The author develops proposed approaches at the example of Irkutsk region.

Keywords: transportation market, mesological system, transport and logistics infrastructure, logistics potential, transport and logistics business, inter-system integration, protocluster, virtual network.

Marketing of Passenger Service Quality

Ivanova E. A.

Pp 102 – 111

Growth in demand for rapid passenger transportation, shown in the article, allows to fix the value of such an indicator of quality of service as travel time. Ways to improve the quality of transport services of passengers by railway companies were revealed and substantiated on the basis of the model of factor groups. Transport market coverage extension was recommended for the purpose of marketing, and deepened demand analysis. Age-related differences in the preferences based behavior of passengers when choosing transport mode were underlined.

Keywords: transport, railway, civil aviation, market, competition, quality of service, passenger transportation, marketing research, demand factors.

Points of Support for Intelligent Systems

Misanova I. N.

Pp 112 – 117

Theoretically justified, but remaining less demanded, innovative mechanisms seek and find reasons to assert themselves. The article gives a special place to the problems of development of Russian intelligent transport systems, especially those that allow to create new high-tech products. This topic has gained priority in the light of importance of restructuring public sector of economy, of the need to update legislation to accelerate the development of intelligence-bearing means of organization and maintenance of transportation process.

Keywords: railway, legislation, economics, intelligent transport system, financial mechanisms, interaction of government and business, government guarantees, venture projects.

Passenger-Cargo Capacity of Inland Waterways of Russian European and Trans-Urals North

Kiselenko A. N., Sundukov E. Yu., Tarabukina N. A.

Pp 120 – 131

The article assesses current state of inland waterways transport in European and Trans-Urals parts of the Russian North. Basing on a scheme of waterways an analysis of traffic volumes dynamics in the region during 1995–2014 period is offered. The article argues that inland water transport is the only mode of transportation allowing residents of certain areas in navigation period to reach regional and district centers, having no alternative in passenger transportation. The ways to increase passenger-cargo structural framework of inland water transport are identified, possible guidelines of reconstruction programs are highlighted regarding river ports, water tourism, cruise ships and routes, logistics technologies.

Keywords: inland water transport, inland waterway vessels, Russian North, Trans-Urals, the Northern Sea Route, transportation.

Quality Standardization: Guidelines and Requirements

Vakulenko S. P., Kopylova E. V., Kulikova E. B.

Pp 132 – 142

At the example of a business unit «Passenger transportation» interdependent objectives of Russian Railways holding in respect of improving quality of customer service based on standardization of services are represented. Three matrices of management systems are shown. They describe passenger transportation, services of station complex, information and preparation for a trip. The purposes of international and federal standards, own regulatory framework of Russian Railways, approaches to systematic assessment of quality of services are commented. The latter defines, according to the authors, the selection by a potential customer of a priority mode of transport.

Keywords: railway, passenger transportation, standards, quality of service, quality management system, consumer demand, client, service matrix.

On Classification of Automated Systems

Dolgov I. S.

Pp 144 – 154

The article deals with the problems of creating a unified classification of automated systems. The urgency of the problem is justified. From the standpoint of

dialectical explanation the properties of objects are analyzed and identified. Signs of belonging to classes, categories, position of systems in categorical ranks, hierarchy of types are described. The author's version of a universal classification is offered.

Keywords: railway, infrastructure, management, decision-making, automated systems, classification, dialectical method

Modeling Transport Culture of Population

Kolesov V. I.

Pp 156 – 160

The article presents the results of a research in the field of modeling of transport culture of population, particularly based on R. Smeed's law modifications. Using experimental data analysis it was found that behavior of citizens on the roads is determined primarily by the level of motorization in the region. The proposed basic model of transport culture of population allows us to solve a number of problems associated with implementation of federal and regional programs of road safety.

Keywords: transport, road safety, transport culture of population, model, transport risk, social risk, level of motorization.

Anti-Ram Protection of Metro Territory

Shvetsov A. V.

Pp 162 – 166

The analysis has shown that present technical means of external protection of metro stations against acts of unlawful interference with the use of vehicles do not respond fully to existing threats. A device for blocking unauthorized access to the territory adjacent to the station is offered. Anti-ram defensive pillar of original design can withstand a blow in case of attempt of a breach of a car with cargo of 20 tons at a speed of 40 km / h. It is an additional resource for strengthening safety and security measures at metro at the time of an emergency.

Keywords: metro, station, outside area, transport safety, transport security, anti-ram means, an act of unlawful interference.

Hazard Class of Water Bodies for Roadbed

Zavialov S. Yu.

Pp 168 – 177

The article explains the use of special methods to assess potentially dangerous water bodies in order to improve safety on a railway network. The negative impact of

different in forms and dimensions manifestations of water element (including floods) may result in violation of integrity of railway tracks, its undermining, and in some cases can cause complete destruction, thus reducing transportation resistance in problem areas. For dynamic and static risk assessment of such situations the author offers selected basic parameters by which all water bodies are divided into six groups. With their help it is possible to organize preventive work in time in order to prevent or reduce effects of water emergency.

Keywords: railways, infrastructure, safety, water bodies, classification, assessment of danger, element, emergency.

Method of Estimation of Clip-Bolt Intermediate Fastenings Failures

**Lysenko N. N., Meleshonkov E. I., Derzhavin A. N.,
Pp 178 – 18**

The authors solve the problem of determination of operational risks relating to elements of a railway track under increasing over time changes in the track geometry due to weakening or breakdown of clip-bolt intermediate fastenings. To evaluate fastenings' failures a method is offered based on the use of a parameter of rails' displacement under train load. The parameter can be obtained by using automated diagnostic devices type KVL-P, ADK-I and «ERA» and similar to them. The article provides calculation of rail head displacement value, depending on the number of defective fastenings. The conditions for method' s application are stipulated.

Keywords: railway, railway track, operational risks, failures of rail clip- bolt fastenings, evaluation method.

Structure of Environmental Requirements for Industrial Facilities

Popov V. G., Borovkov Yu. N., Sukhov Ph. I.

Pp 186 – 192

One of the key factors of rail transport's sustainable development is constituted by environmental requirements of «green construction». They are designed to comply with Russian and international law, the principles of industrial strategy and long-term programs and should be defined by a set of categories that reflect current view on environmental standards, which in turn can be «served» by a separate group of criteria designed for it. The article offers a structure of environmental requirements for construction and operation of buildings and facilities of railways, which involves effective implementation of environment-focused construction technology, and provision of environmental sustainability.

Keywords: environmental engineering, building, construction, rail transport, sustainable development, «green construction», resource conservation, environmental protection, structure of requirements.

Influence of the Time of Day on Road Traffic Accident Rate

Pechatnova E. V.

Pp 194 – 200

The author proceeds from the fact that human-saving efforts, technically sound and environmentally efficient measures to reduce accident rate on roads (and especially on country roads) can bring the expected results only if there is a well-established system of accident prediction. These prediction methods should take into account the impact of a complex of factors, including the time of the day, traffic intensity, features of road environment and other significant aspects of the transport process. In the present study the focus is put on dependence of traffic accidents on the period of the day, the nature of day, night and twilight hours of a calendar cycle.

Keywords: roads, time of traffic, accident rate, consequences of road accidents, human factor, forecasting, prevention.

International Trends in Transport Education and i Its Development

Karapetyants I. V., Toumazou, Emmanuel

Pp 202 – 211

The authors give an overall assessment of transport education in the leading countries of the world, highlight the most characteristic features of university programs and forms of education, trends in development of scientific and educational activities of universities against the background of increasing globalization of production and economic relations. The significance of education internationalization is emphasized, and with regard to labor market problems of logistics training in universities, including through joint training programs of domestic and foreign universities are underlined.

Keywords: transport, higher education, university, logistics, logistician specialty, labor market, international cooperation, joint training programs.

Staff Potential of the Industry

Orlov S. N., Litvinenko M. S.

Pp 212 – 221

The article investigates economic category of staff potential of railway industry enterprises. Various approaches to conceptual apparatus are considered, an analysis of its derivatives and basic components that characterize sectoral staff potential is given. An example of Kurgan division of training center of professional

qualifications of the South Ural Railway shows parameters of the system of training of workers of mass professions and existing evaluation principles, training courses staffing criteria.

Keywords: railway, economic potential, staff potential, training, personnel evaluation.

Engineering in University Curricula

Lisenkov A. N.

Pp 222 – 229

The principles and contents of engineering approaches expounded in university curricula and designed to shape students' responsible attitude to quality of final product of their work are considered. They include robust design of advanced systems and management activities, as well as methods of multicriteria evaluation of objects with indicators of different nature to make sound management decisions. Characteristics of software and techniques underlying teaching of disciplines on innovative and strategic management, personnel management of transport organizations is given.

Keywords: transport, higher education, quality management, curricula, engineering, robust design, multi-criteria evaluation of objects, indicators of non-numerical nature, software, methodology.

Modeling and Process Approach to Personnel Management

Kozyrev V. A., Zenina N. N.,

Pp 230 – 24

The article substantiates relevance of implementation of process approach to personnel management at JSC Russian Railways, the role of operational processes to improve efficiency of transport operations. As an embodiment of methodology authors demonstrate initiated pilot project at Moscow railway. It is based on modeling of personnel management processes at the level of regional corporate center, development of regulations, standards, process management algorithms. Testing of the model promises a positive result.

Keywords: railway, personnel management, process approach, operational processes, process architecture, algorithm, regulation, standard.

He Measured Light Pressure

Grigoriev N. D.

Pp 242 – 249

Pyotr Lebedev has entered the history of science as an experimenter-physicist who first investigated millimetric electromagnetic waves, measured pressure of light on solids and rarefied gases, and as an organizer of collective research and large research laboratories, that can be deemed as a model for modern scientific institutions. For the history of MIIT University he is significant due to the fact that he was the first head of the department of physics, and it happened in a year of establishment of MIIT University, exactly exactly 120 years ago.

Keywords: history of science, Pyotr Lebedev, light pressure, millimetric electromagnetic waves, scientific school.

Surami Tunnel: Penetrating Power of Oil

Glonti A. N.

Pp 254 – 260

Surami railway tunnel is located on mountain crossing section Zestafoni – Khashuri of Georgian Railway. It was built in 1886–1890 years under the guidance of the engineer F. D. Rydzevsky. Tunnel length is 4 km. It is double-track, electrified, DC network. Daily more than 50 pairs of passenger and freight trains pass through it. The article describes construction of a tunnel in difficult geophysical and production and technical conditions, and the project itself, which was unusual for those times.

Keywords: history, railway, Surami tunnel, construction project, excavation, engineering solutions.

«Everything must be studied again»

Vladimirov Yuri

Pp 262 – 268

Review of the book: The future of engineering education: Collection of scientific articles / Ed. by A. A. Alexandrov, V. K. Baltyan. Moscow, Bauman MSTU, 2016, 268 p.

The publication contains topical reports on development of engineering education and inter-university cooperation in the country, the authors of which are representatives of higher educational institutions of different industry profile. A common feature is their belonging to the Association of Technical Universities and

the Union of scientific and engineering societies, the successor of the Russian Technical Society, celebrating its 150th anniversary this year.

The collection includes articles on topical issues of engineering education, improvement and renovation of educational and scientific process of training of engineering and scientific personnel, development of integration research and production educational structures in higher education institutions, members of the Association of Technical Universities and working closely with it.

The papers reflect inter-university cooperation and interaction of various scientific and pedagogical schools, practical implementation of the basic principles of engineering education, such as «learning through science», «synthesis of theory and practice», «integration of education, science and production» by leading technical universities.

The publication is designed for a wide range of workers of governing bodies in the field of education, industry, labor and employment, managers of industrial enterprises and organizations, scientific and educational institutions of all levels of engineering and technical education. It may be useful in solving the problems of development of national education systems, improving training and activities of higher education institutions, addressing staffing in various spheres of social production and, above all, for enterprises of high-tech complex at the international level in the framework of the Commonwealth of Independent States.

Keywords: engineering education, scientific and pedagogical schools, inter-university cooperation, connection to production, information technology, scientific and technological progress, development, innovation.