

New Perusal of Locomotive Traction Force Formation Mechanism

Koblov R. V., Egorov P. E., Novachuk Ya. A.

Pp 6 – 18

Based on the classical provisions of theoretical mechanics and the fundamental theory of kinematics a new interpretation of the mechanism of formation of power criteria of a wheel-motor unit of a locomotive is offered and their calculations are suggested. Analytical justification of the criteria for formation of traction force of wheel-motor units of modern and advanced locomotives, combined with real data of diameter of wheels and loads from the wheels on the rails, ensures the development of traction calculation methods and high reliability of a priori values for the parameters of traction in Russia and other countries. The subject of the study is to adjust the method of calculating the traction force of a wheel-motor unit of a locomotive and to study its formation mechanism.

Keywords: locomotive, wheel-motor unit, formation of traction force, theoretical mechanics, theory of kinematics.

«Ecological Imperative» and Innovative Development of Transport

Macheret D. A., Izmaikova A. V.

Pp 20 – 31

The article considers one of the key characteristics of the new industrial revolution which is the increase in environmental friendliness of production or the «ecological imperative». Areas for improving environmental friendliness in the transport sector have been identified, and a number of inventions (innovative proposals) have been analyzed that contribute to the implementation of the ecological imperative. On the basis of the analysis, a matrix classification of innovations is presented, representing innovations significant for transport, primarily railway. Conclusions are drawn regarding the long-term development of rail transport in order to improve its environmental friendliness, an adequate response to the global challenges of the future.

Keywords: railway transport, ecological imperative, innovative development, economic growth, energy efficiency, bionics.

Interaction of Participants in Supply Chain in the Context of Neoindustrialization

Rachkovskaya I. A.

Pp 32 – 36

The rapidly changing industrial and information environment inevitably makes it necessary to transform the usual management approaches and technologies. For supply chain participants, factors of the Internet networking, possibility to increase the value of the existing system for clients due to logistics resources, closer communication contacts of goods suppliers, carriers and consignees are especially important. That revolutionary construction of neo-industrial relations is shown by the author extremely laconically, referring first of all to essential aspects of the ongoing process.

Keywords: transport, management, logistics, supply chain, neoindustrialization, communication.

Fluctuations of Solid Subgrade

Burombaev S. A., Zamukhovskiy A. V., Kvashnin M. Ya.

Pp 38 – 45

The results of measurements of the characteristics of vertical oscillations of the base of the main site of a stable embankment of subgrade of a railway track under the influence of an electric locomotive VL-80 with different speeds of movement are given. Experimental studies were carried out in Kazakhstan on the section of the enlarged Almaty maintenance section. The dependencies of the parameters of the oscillatory process on the speed of locomotive motion that can be used as evaluation criteria in the development of railway embankment monitoring systems are revealed. The expediency of further experimental studies in the zones of problem embankments with soils prone to thixotropy was noted.

Keywords: railway track, subgrade, main platform, vibration speed, vibration displacement, vibration acceleration, vibrogram, accelerogram, amplitude-frequency characteristics.

Dependence of Train Sorting Time on the Turnout Track and Duration of Semi-Trip

Shmulevich M. I., Starikov A. E.

Pp 46 – 55

The duration of sorting of the train on the turnout track is determined by the known formula $T_{\text{sort}} = A \cdot g + B \cdot m$. At the same time, the duration of all semi-trips –

arrival of the locomotive behind the part of the train, its extension to the turnout track, sorting and reverse pulling of the remaining cars – were calculated according to the formula $t_{s/t} = a + b_m$, which is now replaced by a new method for adjusting the shunting operations. The article presents the results of a study that made it possible to derive a formula for calculating the duration of the sorting of a train on the turnout track based on a different calculation of the duration of semi-trips.

Keywords: railway, turnout track, duration of sorting, duration of semi-trip, calculation formulas.

Polymer Insulators for Contact Network Devices

Lukyanov A. M., Chepelev Yu. G.

Pp 56 – 70

The results of studies of the developed designs of polymer suspension, tension, console, fixation and support insulators of the contact network are given. Recommendations for their maintenance and engineering support are suggested.

Keywords: railway, contact network, polymer insulators, types of structures, reliability, maintenance.

Logistics of Perishable Goods in the Process of Transport Interaction

Ushakov D. V.

Pp 72 – 77

Transportation of perishable goods across the territory of the Russian Federation faces considerable difficulties, including regular transformation of economic conditions. The main problem in this issue is to determine the degree of significance of the criteria of logistical processes associated with the delivery of perishable goods. The article presents the main parameters of logistical transport processes in the delivery of ordinary and perishable goods, their comparative assessment was carried out. On the example of analysis of cargo flows in the port of Vladivostok, time intervals of increased demand for logistics services were revealed. Optimal schemes of interaction of various modes of transport in the service of perishable goods are determined.

Keywords: logistics, perishable cargoes, parameters of transport processes, seasonality, refrigerated container, Cool Chain delivery technology.

On Competition on Eurasian Routes and on Consolidation of Legal Relations

Zhukov V. P.

Pp 78 – 82

The article shows how the main tasks that the Organization for Cooperation between Railways (OSJD) sets for itself while meeting the challenge of growing competition in the international transportation market are being solved. The problems of transport corridors between Europe and Asia, mechanisms of legal regulation, economic contracts, border crossings, as well as the effectiveness of the existing programs for development of the railway complex within the borders of OSJD member countries are particularly considered.

Keywords: OSJD, international transportation, railway transport, Eurasian corridors, market, competition, legal relations.

Influence of Tariff Policy of Railways on Competitiveness of Coal Industry

Khusainov F. I., Ozherelieva M. V.

Pp 84 – 95

The article examines the role of coal and its contribution to the profitability and volumes of transportation of JSC Russian Railways. Tariffs for transportation of coal by rail and transport (rail) component in the final price of this type of fuel were analyzed. It is shown how the railway tariffs and the transportation distance affect the competitiveness of the Russian coal industry.

Keywords: railway, transportation, tariffs, coal, price, transport component, rates of rolling stock operators, competitiveness.

New Paradigm of Economic Security Management of Transport Logistics Systems

Bubnova G. V.

Pp 96 – 101

While assessing the role of transport and logistics systems and supply chains, the author justifies a new management paradigm in which, in the market regulation of business relations, an acceptable level of economic security should be provided at all stages of freight transportation. Transport Logistics Systems' (TLS's) safety indicators are demonstrated, the significance of their value terms, conditions and mechanisms, information and organizational components necessary for design and implementation of the proposed schemes of commodity circulation are shown.

Keywords: economy, logistics, supply chain, transport and logistics systems, economic security.

Evaluating the Effectiveness of Technology Use in Implementation of Infrastructure Projects

Podsorin V. A., Zavalova N. F.

Pp 102 – 110

The evaluation of investment projects is central to the process of study and choice of possible options to invest in development projects. The article shows the main indicators for assessing the effectiveness of investment projects, analyzes the main advantages and disadvantages of each of them. At the same time the socio-economic importance of one of the largest high-speed rail project «Moscow–Kazan» is considered on the basis of calculation of such economic indicators as resource intensity, depreciation intensity, labor intensity and material intensity.

Keywords: transport, railways, technical means, large-scale development project, economic efficiency, high-speed rail «Moscow–Kazan».

International Patent Resources in the Study of Innovative Technologies (at the Example of GLONASS/GPS)

Andreichikov A. V., Andreichikova O. N.

Pp 112 – 126

In the work presented by the authors and based on the use of the international patent resource Qustel-Orbit, the state of innovative activity and patenting in the field of satellite navigation GPS-GLONASS was revealed for the entire period of patenting of inventions in the world until 2014. Inventions based on the use of GPS-GLONASS systems have a wide range of practical applications. In the area under consideration, the largest number of patents is published in China, the United States, and Korea. In this row, Russia occupies the eleventh place. The positioning of patent owners was suggested according to the indices of relative similarity and with the stage-by-stage processing of information according to a given algorithm.

Keywords: patent resource Qustel-Orbit, FIPS, innovative technologies, satellite navigation, GPS, GLONASS, system analysis, patent owners.

Urban Transport Systems and Development of Intermodal Transportation

Vlasov D. N.

Pp 130 – 139

The article considers current trends in development of urban passenger transport systems. The emergence of new types and ways of transporting people in megacities (in particular, light rail, high-speed bus), formation of modern transport-interchange hubs are highlighted as the main ones. The practical example shows general principles of arrangement of the latter taking into account the peculiarities of metropolitan public transport and a type (nature) of combined trips.

Keywords: urban transport, intermodal transport systems, light rail, high-speed bus, interchange hubs.

Prospects of Intermodal Transport Service System

Danilina N. V.

Pp 140 – 151

The article is devoted to the problems of development of intermodal transport system of large cities and agglomerations. The results of surveys regarding evaluation and identification of the prospects of transport service are presented. The model of the developed system allows to visually show the state of the urban transport network. Approbation of the proposed model in Moscow agglomeration makes it possible to assess the existing and develop a promising program for development of passenger intermodal transport, which corresponds to the modern quality of transport services for the population of the metropolis.

Keywords: intermodal transport system, metropolis, passenger transport, individual transport, transport and transfer hub, «intercepting» parking.

Balance of Interests in a Car Fleet Service Contract

Gryaznov M. V., Antropova E. M.

Pp 152 – 165

The way of achievement of balance of interests of a customer and of a contractor during service of cars which became possible on the basis of differentiation of a contractual value of technical availability rate is grounded. It is suggested within techniques of calculating technical availability rate to take into account the increase in the total number and total labor intensity of repair actions for a calendar period as the car fleet ages. Advantages of the proposed recommendations

are shown at the example of service maintenance of open-pit dump trucks of a large metallurgical enterprise.

Keywords: car fleet, service maintenance, technical availability rate, contractual value, balance of interests.

How to Load Empty Cars' Flow

Lakhmetkina N. Yu., Galkina O. V.

Pp 166 – 175

The topic of increasing the efficiency of empty gondola cars is considered by the authors at the example of the West Siberian Railway. In the process of analyzing the situation, it was revealed that the main problems that have arisen with the multiplicity of owners of rolling stock are a consequence of the lack of a single mechanism for managing cargo flows and are at the interface of interaction with different structures, small and large, federal and local. It is necessary to build a new management system for empty car flows and regulate this system, in particular the roles of participants in the transportation process, including the operator. The technology of operation of companies-operators with a park of empty open cars, the order of normalization and planning of their approach to coal loading stations of the road are shown. Compliance with such technology allows to significantly increase the level of loading of cars, improve the fulfillment of delivery deadlines.

Keywords: management, railway, empty car flow, operator, cargo owner, plurality of owners, transportation process.

Logistics Center: Information Support Points

Sinitsyna A. S.

Pp 176 – 181

Justifying the terms of interaction of participants in the process of cargo transportation, the author considers measures of national and local character for increasing the efficiency of transport and logistics centers (TLC). Particular emphasis is placed on information systems, the role of which is defined as the main one, and their participation in the work of TLC – as decisive in the implementation of management actions in servicing clients-customers of railway services. Functions of information support of logistic activity are shown.

Keywords: transport, logistics, TLC, information technologies, navigation systems, cargo transportation, supply chain management.

Rationalization of Speed Modes for Safe Movement of Trains

Shepitko T. V., Bolotov A. S.

Pp 184 – 189

With the strategic predetermination for construction of high-speed railways, the question of regulating train speeds is inevitably raised in order to ensure their safety and reduce the risks of accidents. The conducted researches give variants of challenging the existing threats, rationalization of speed regimes on the country's railways. The concept of «train flow» is introduced; calculations of protective schemes are made.

Keywords: railway, high-speed line, safety, train flow, rationalization of speed regimes.

Assessment of Harmful Chemical Factors in Maintenance of Batteries

Aksenov V. A., Yudaeva O. S., Ovanesova E. A.

Pp 190 – 196

The article analyzes the specifics of the aspects of occupational risk to the health of workers in the battery compartment of a passenger car depot caused by chemical contamination of the industrial environment. The results of the research of the heavy metal content in workrooms are presented, the issues of monitoring and normalizing labor conditions in the presence of harmful chemical factors are considered.

Keywords: railway, car depot, storage batteries, chemical factor, heavy metals, control and rationing, production environment.

Scheme of Control of Engineering Structures' Technical Condition

Kos O. I.

Pp 198 – 204

Reliability of artificial structures on the railways is directly related to safety of life of passengers and cargo. The proposed scheme of control of technical condition of the span allows to calculate with a great precision design reliability and to predict its changes, to respond flexibly to the dynamics of the operating conditions, as well as to control optimally the processes by the criterion «reliability–cost».

Keywords: railway engineering structures, span, reliability, security, recursive algorithm, optimal interval.

Post-University Follow-Up of Graduates in Distance Learning Format

Chernyaeva G. V.

Pp 206 – 213

The article proves the necessity of post-university support of graduates of transport universities and the expediency of remote interaction with former students at the stage of their adaptation to industrial environment. The importance and forms of post-university contact with graduates are shown, the problem of finding internal university resources for organizing the continuation of their knowledge acquisition using electronic network communications is posed. Thus, the system task is realized, concerning the concept of continuous education, and at the same time the question of basic recruitment and successive renewal of competencies for a recent graduate is being solved.

Keywords: transport university, professional training, personnel development, basic competencies, forms of post-university support of graduates, remote intellectual support, post-university informal distance learning, continuous education.

Morphological Analysis of Educational Programs in the Context of Increasing the Competencies of Graduates

Koryagin N. D., Sukhorukov A. I.

Pp 214 – 223

The problems of the peculiarities of the structure of main educational programs of the leading higher educational institutions of managerial and economic profile are considered in the context of the gradual increase in information competencies of students. With the help of morphological analysis and the study of the specifics of information content, the necessity of introducing a systematized, integrated and process approach to development of appropriate competencies with account of new trends and priorities that will determine the benchmarks for the graduate of the university is justified.

Keywords: university, transport environment, information competence, process approach, educational programs, morphological analysis, vocational training.

How to Manage Railway Staff' Turnover

Epishkin I. A., Frolovichev A. I.

Pp 224 – 237

The authors describe the results of a study of the influence of external and corporate factors on the staff turnover level in the Central Directorate of

Infrastructure – a branch of JSC Russian Railways in the context of regional directorates. Based on the econometric tools, mathematical equations of the dependence of staff turnover on the factors identified were made, economic conclusions on the use of the dependencies found in human resources management were drawn, and the prospects for continuing research in this field were considered.

Keywords: railway, human resources, staff turnover, wages, turnover factors, turnover management.

Interrelation of Competitiveness, Organizational Structure and Human Resources

Pismennaya A. B., Vlasyuk G. V.

Pp 238 – 248

The authors examine the mutual influence and interdependence of the human factor, the structure and competitiveness of the organization, the differences in the effectiveness of its individual elements, the features of such characteristics as the competencies of individual agents that make up the organization. The problems of occurrence of problem zones in the organization structure and ways of their elimination are analyzed. On the basis of the revealed regularities, the possibilities of managing the efficiency of organizations, including the example of the transport sector, are considered.

Keywords: human resources, personnel management, internal communications, communication networks, organizational structure, transport sphere, competitiveness, organization efficiency.

On the reform of engineering education Transcript of the report at the ordinary meeting of Polytechnic Society, January 17, 1915

Grinevetsky, V. I. (1871–1919)

Pp 250 - 261

Vasily I. Grinevetsky (1871–1919) – Russian scientist in the field of heat engineering. In 1896 he graduated from the Imperial Moscow Technical School (hereinafter – I.M.T.S.) and stayed to work there: since 1900 – professor, since 1914 – director of the School.

As a scientist V. I. Grinevetsky investigated workflows occurring in steam engines, boiler units and internal combustion engines. In 1905, he developed a scheme of boiler thermal calculation, based on correct understanding of heat transfer processes, and in 1906 – theory of economic calculation of a working process of a steam engine. For the first time in the world in 1907 he offered thermal calculation of internal combustion engine still underlying design and analysis of workflows of these

engines. Important works were devoted to locomotives. He presented the project of transformation of Moscow Technical School into a higher school of polytechnic type. That meant in fact the reform of engineering education in the country.

Keywords: history, engineering education, technical school, prospects of development, connection with practice, academic structure, reform.

THE FLYING WILL SEE THE ROAD

Antsev G. V.

Pp 266 - 271

Biard R., McLain T. Small unmanned vehicles: theory and practice / Trans. from English. Moscow, Technosphere publ., 2015, 312 p.

The book, published in the series «World of Radio Electronics», is addressed to those involved in unmanned aerial vehicles. The emphasis in the book is on systems for increasing the sustainability of control of these miniature aircrafts, designed primarily for applied purposes. Other publications that would cover the issues of modeling the dynamics of this class of unmanned aircrafts, assessment of their state and prospects, calculation of the flight trajectory, according to the authors who prepared the book for publication, are currently not available.

Keywords: small unmanned aerial vehicles, modeling, kinematics, dynamics, autopilot, control, navigation, scope of application.