

**On Main Directions of Development of the Global Transport System and Logistics**

**Vladimirov S. A.**

**Pp 6 – 19**

In the article based on the experience of leading countries and the real state of domestic transport the directions of development of the global and domestic transport systems, their interdependence are substantiated, current trends towards globalization and integration of international transportation markets, logistics processes are assessed. With regard to the renewed transport strategy of the Russian Federation the author calls three forecast scenarios, of which highlights the innovative, and formulates requirements designed to mobilize the resources of the Russian transport system.

**Keywords:** global transport system, development trends, strategy, modes of transport, competition, innovation, macroeconomics, quality, efficiency.

**On Estimation of Railway Track State**

**Vakulenko S. P., Volosov K. A., Volosova N. K.**

**Pp 20 – 35**

Building hardware complex diagnostics of railway track on the basis of analysis of dynamic processes in the movement of train does not have alternatives at the moment. Similar methods have long been used in the operation of aircraft and other fields of technology and mechanical engineering, biomedical field. The ability to simplify calculations of model tasks is provided by authors' additions to the theory of basic models of «Timoshenko beam» in different situations.

Inhomogeneous system of linear differential equations with partial derivatives of the second order is accurately reduced to sequence of solution of two classic mixed problems classic mixed problems classic mixed problems hyperbolic and Klein-Gordon-Fock. It is shown that the system has two scales (two basic frequencies). The effect of abnormally rapid fluctuations oscillations is explained. A semi-analytical is explained. A semi-analytical is explained. A semi-analytical offered that allows to compare effects caused by different boundary conditions.

**Keywords:** diagnostics of railway track, principles of system construction, Timoshenko beam models, partial differential equations, abnormally rapid fluctuations oscillation, effects comparison.

## **Formation of Territorial – Industrial Clusters Based On Adaptive Transport Infrastructure**

**Tararychkin I. A.**

**Pp 36 – 49**

A method for formation of territorial-regional industrial clusters on the basis of flexibly changed and created transport infrastructure was developed. Objective functions and quantitative criteria, allowing to establish the position of transport units of the system at the local level were formulated. It is shown that location of a transport junction depends on whether it is active or passive. Calculated dependences were offered, allowing to solve the problem of structural synthesis in the framework of regional transport system.

**Keywords:** transport, system, synthesis, infrastructure, optimization, clusters, territory, production.

## **Use of Fourier Integral Transform in Calculation of Structures**

**Kosaurov A. P.**

**Pp 50 – 58**

This paper presents a method to obtain a system of linear equations describing a final element in the frame structure. In solution process integral Fourier transform and generalized functions are used. The boundary conditions at the ends of the finite element are determined by the theorem of Paley–Wiener–Schwartz. Application of the method for calculation of beam, cable-stayed bridges and extradosed bridges allows to set all kinds of loads without replacing them with any equivalent.

**Keywords:** bridge, superstructure, reinforced concrete structure, finite element method, generalized functions, differential equation of Timoshenko beam, integral Fourier transform, theorem of Paley–Wiener–Schwartz.

## **Development of Polymer Consoles**

**Lukyanov A. M., Chepelev Yu. G.**

**Pp 60 – 71**

The article introduces the development of new polymer consoles for high-speed transport. The results of research of electrophysical characteristics of fiberglass rods are provided. The possibility of a wider use of fiberglass based on epoxy binder is shown. Polymer consoles are tested for mechanical and electrical load, as well as

the latest design of end terminals. The test was conducted including lightning impulse voltage.

**Keywords:** high-speed transport, console, contact network, polymers, fiberglass, electric strength, mechanical properties, durability.

### **Hybrid Propulsion Unit**

**Glushchenko M. D., Goryunov I. O.**

**Pp 72 – 79**

The authors presented a conceptual idea of a high-speed mainline with a maximum speed of 400–450 km/h. The use of rotary engines requires more energy at high speeds, there are difficulties with current collection, wheel-rail adhesion, etc. At the same time, the use of a linear traction motor at low speeds is not justified from an economic point of view, but efficient at high speed in terms of operation. In this regard, an option of a combined or hybrid traction propulsion unit is offered, in which the positive aspects of previous models interfit.

**Keywords:** transport, high-speed trains, high-speed lines, linear synchronous motor, asynchronous traction electric motor, resistance to motion, wheel-rail adhesion force, hybrid propulsion unit, conceptual idea.

### **System for Maintenance and Recovery of Contact Network**

**Shubin A. A., Vitchuk P. V.**

**Pp 80 – 87**

The authors analyzed the possibility of using screw piles as the basis of supports of railway catenary system. The efficiency of their use is justified. A multifunctional complex for installation of catenary system's supports is offered. The element of software and hardware system for stabilization and overturn protection of the complex is presented.

**Keywords:** screw piles, railway complex, catenary system, support, repair work, construction, stability.

### **Statistical Analysis of Strength Assessment of Nonrigid Pavement Surfacing**

**Tiraturyan A. N., Uglova E. V.**

**Pp 88 – 97**

The authors examine the issues related to statistical processing of the results of measurement of elastic deflections on the surface of nonrigid pavement surfacing

made by shock loading installation FWD. Based on these results the nature of distribution of elastic deflection was clarified and assessment of homogeneity for pavement surfacing in areas with different service life was carried out. It was found that with a sufficient degree of probability distribution of such deflections can be described by the lognormal law.

**Keywords:** car, nonrigid pavement surfacing, elastic deflection, modulus of elasticity, installation of shock loading, coefficient of variation, lognormal distribution.

## **Cargo Control on Handling Machinery**

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

**Pp 98 – 105**

Any weighing systems create, if it is necessary to use them, a lot of problems during transportation and handling. The paper proposes a non-contact method for evaluating maximum permissible load mass values of cargo lifted (moved) by handling machines according to the value of magnetic field strength, which is created by a DC motor. Measurements do not require complex and expensive equipment, intervention in electrical circuits and design of devices, but provide sufficient accuracy in determining load on a crane.

**Keywords:** handling machinery, DC motors, permanent magnetic field, magnetic field strength, ferroprobes, cargo weight, maximum permissible values estimation.

## **An Innovative Approach to Roadbed Reconstruction**

**Gorlov A. V.**

**Pp 106 – 122**

The article introduces the research in the field of reconstruction and strengthening of the roadbed of railways, the method of calculation and design of dowel-lath structures, reinforcing the surface sloping parts of the subgrade, created with the author's participation. The rational dowel sizes are defined, innovative technical solutions for the roadbed for construction of the second tracks are offered, using mathematical and physical centrifugal modeling. The laboratory installation and technique of bench tests of reinforcing elements for different types of dowel structures are developed.

**Keywords:** railway, roadbed, dowel, innovative structure, modeling, design, bench testing, reconstruction, calculation methods, reinforcing elements.

## **The Methodology for Calculation of Indicators Related to Passenger Trains of Unchanged Composition**

**Makarova E. A., Sokolovsky A. V.**

**Pp 124 – 131**

Using the example of railway direction Moscow– Penza the article provides economic justification for the use of passenger trains of unchanged composition in growing competition environment in the transport market. At the same time the role of strengthening customer loyalty in attracting additional passenger flow and the value of proposed methodological tools that provide the calculation of total costs for organization of trains with rigid train scheme, as well as revenue and payback indicators of capital investment are estimated.

**Keywords:** transport market, competition, railway, train of unchanged composition, passenger flow, investments, payback, economic efficiency.

## **Regional Effects of High-Speed Railways Projects**

**Pyataev M. V.**

**Pp 132 – 141**

External effects induced by construction of high-speed railways are analyzed. It is shown that large-scale transport projects need to be evaluated from the perspective of economic and social efficiency. Taking into account only the cost-effectiveness of inter-regional high-speed lines is a theoretically incorrect task and this will practically disorient investors and the state as main participants in designed high-speed lines.

**Keywords:** high-speed line, project, construction, railways, multiplicative effect, public interest, regional economy, state, finances, investors.

## **Determination of Section-to-Section Costs for Maintenance and Operation of Infrastructure**

**Inozemtseva S. M., Moroz N. S.**

**Pp 142 – 153**

The network contract as a method of state regulation of rail infrastructure has been used successfully in a number of countries. Its main objectives are guaranteed transport support of socio-economic needs of areas within priority geographical configuration, optimization of internal costs of infrastructure complex owner and maintenance of service availability in transportation system to the public. Special attention is paid to the methodology and the economic model for determining

operating costs for infrastructure maintenance of low intensity rail sections. Calculations made on that basis justify required subsidies, budget investments and allocations for implementation of the tasks provided for also by a network contract.

**Keywords:** railway transport of general use, infrastructure, network contract, methods for calculating the cost, low-intensity lines, operating costs, revenues, financial results.

### **Logistics Subculture of a Transport University Student**

**Akhtyamov N. T., Ilyasov R. R., Samoylenko, V. A.**

**Pp 154 – 164**

One of the objectives of a higher education institution is to form student's objective scientific picture of the world and make it an integral part of his world. If it is impossible to convert a theoretical knowledge into a practical, reflecting, a university graduate will have no sustainable life goals and attitudes, including those relating to the public role and functional significance of transport. This article describes a way to solve this problem on the basis of logistics culture. Experiment in Ufa, held throughout the year, showed a growing need for shaping for a future transport specialist an industrial logistics subculture able to perceive current speed and format of movement of people and goods.

**Keywords:** transport university, educational paradigm, scientific picture of the world, logistics culture, student's subculture, competitiveness coefficient, research project.

### **How to Reduce Downtime of Freight Cars Awaiting Loading?**

**Eliseev S. Yu., Shatokhin A. A.**

**Pp 166 – 175**

The process of ensuring car loading is much dependent on stochastic factors. The presence of such a dependence forces operators to create technological reserve at the point of loading operations. The authors considered the impact of fragmentation of freight rolling stock on the stock level and economic results of work, as well as opportunities to consolidate resource management under a single basis in order to increase productivity and profitability of the industry

**Keywords:** railway, freight yard, loading operations, stochastic factors, car stock, loss reduction, car management consolidation.

### **Hopper for Bulk Cargo excluding Manual Labor**

**Prusov M. V.**

**Pp 176 - 181**

Domestic transportation, storage and terminal structures in recent years cannot cope with volatile market load. This is clearly illustrated by, in particular, grain transportation.

An innovative solution to the problems of interaction of storage and transport facilities in terms of anti-crisis measures in the country, according to the author, refers to a construction of grain storage with easily controlled technological process, proposed by the author.

**Keywords:** transport, infrastructure, grain storage, loading / unloading, controlled process, innovative design.

## **Modernization as the Best Way to Organization**

**Zasorina G. V., Deikin S. A., Romanov A. M.**

**Pp 182 – 189**

Modern transport infrastructure of Moscow is undergoing fundamental changes. Inside the city at large freight stations a frame made of terminal and logistics centers is created to optimize local work and to further increase the volume of cargo processed. The article examines challenges faced by metropolitan freight stations, and offers methods for solving issues relating to organization of local work, reconstruction of stations, an increase in the volume of cargo transportation, logistics activities of transportation companies.

**Keywords:** transport, railway, terminal and storage complexes, reconstruction, freight stations, Moscow node, local work, terminal and logistics centers.

## **The Motives of Drivers' Behavior when Changing Lanes**

**Yakimov M. R.**

**Pp 190 – 199**

In the context of psycho-physiological model of the car driver's behavior a place of behavioral situation «lane change» is considered within a common set of factors affecting the duration of transport correspondence. The definition of required lane change maneuver by own vehicle is given. With the help of mathematical calculations and full-scale video surveillance change in movement of other vehicles when changing lanes on a multilane highway is investigated.

**Keywords:** car, road, driver's behavior, manner of driving, psychophysiological model, traffic flow, lane change.



## **Problems of Frictional Ignition in Transport Vehicles**

**Struchalin V. G.**

**Pp 202 – 211**

The article examines the problem of ignition ability of friction sparks when servicing rolling stock. It indicates the possibility of accidents associated with inflammation of gas-steam-air mixture. The mathematical analysis of sparking intensity was performed using basic equations. It is established that as a measure of intrinsic safety can serve a criterion that depends on intensity of sparking.

**Keywords:** transport, transportation of dangerous goods, flammable liquids, ignition source, friction sparks, sparking, intrinsic safety measure.

## **Comprehensive Approach to Safety of Maritime Container Transportation**

**Tsarik R. S.**

**Pp 212 – 231**

The whole complex of factors of risk and safety problems in terms of maritime container transportation is accompanied in the article with scientific analysis, which aims to find the most rational organizational and technical solutions. This task is performed in a constructive way, consistently and objectively, using algorithms of calculation and methodological tools that promise to secure control over safety of containers in a terminal and on a ship in the process of goods movement across the supply chain.

**Keywords:** maritime transport, container, transportation, dangerous goods, risks, data system, safety control.

## **Road Accidents: Transport and Social Risks**

**Volchatova I. V.**

**Pp 232 – 242**

On the basis of statistics of traffic accidents accident rate on the roads of Irkutsk region was analyzed. It is shown that the majority of accidents with victims occur due to violations of traffic rules by drivers. The dependence of the number of accidents and injuries on time of day was identified. The maximum contribution to accident rate is made by car drivers.

**Keywords:** car, traffic safety, accident rate on roads, traffic accident, transport risk, social risk.



## **System Approach to Training of Managers of Aviation Enterprises in Information Society**

**Eliseev B. P., Koryagin N. D.**

**Pp 244 – 253**

The article considers the modern approaches to formation of professional information competence of managers of aviation enterprises on the basis of application of modern information technologies used by airports and airlines to improve profitability and the level of loyalty of the target consumers of air transport services in educational process of the air transport university.

**Keywords:** civil aviation, aviation enterprise, information society, information technology, information systems, air transport university, information competence.

## **Roots of Human Resource Management Efficiency**

**Starovoit V. A., Futin V. N.**

**Pp 254 – 261**

The basis of human resource management efficiency is competence-based approach to the staff and its organization. The authors analyze the structure and purpose of competences, basic values and competitive advantages of a transport company defining its sustainable organizational development, staff audit as a principle of management decision-making based on actual data, and the methodology and the system of social management, which help to improve the quality characteristics of labor force and the efficiency of human resource management of a transport company.

**Keywords:** transport, human resources, human resource management, competence, efficiency, quality management, social management, staff audit.

## **System Support for Fulfillment of Established Requirements by Staff**

**Vorontsov V. I.**

**Pp 262 – 269**

From different points of view coming to complex dependencies that relate to fulfillment of technological and security requirements for transport, the author evaluates subjective factors, technical means of control in operational work of staff as well as the possibility of systemic support for professional activities of transport specialists through the use of modern knowledge, information and management technologies, training and educational programs.

**Keywords:** transport, operational management, control means, safety, risk zone, violation, staff, dispatching service, responsibilities, action algorithms.

### **Management by Objectives and Motivation for Strategy Implementation**

**Sorokina A. V., Epishkin I. A.**

**Pp 270 – 280**

The article deals with problems of management by objectives and development of personnel motivation system for implementation of transport company's strategy. It substantiates the idea that a well-built strategy of involving staff in matters of general interest has a significant impact on efficiency of interaction of structural units in business processes. The authors pay a particular attention to need for formation of key performance indicators that affect the achievement of objectives at various levels. These indicators should be formed on the basis of comparison of main tasks of individual departments and tasks defined by holding company development strategy.

**Keywords:** transport, company holding, management by objectives, motivation of staff, key performance indicators, bonuses, decomposition of objectives.

### **Passenger Cars of Pre-Revolutionary Russia**

**Tarasova V. N., Bepalko S. V.**

**Pp 282 – 287**

A retrospective review of the initial period of formation of the passenger car fleet on domestic railways shows the transformation of technical ideas, design features of railway vehicles, comfort conditions, travel convenience for passengers.

**Keywords:** railway, passenger car, history, technical progress, common comfort.

### **«Европейский журнал региональной логистики» и Европейская сеть центров логистических компетенций «Open ENLoCC»**

**Luppino Giuseppe, brandt Martin**

**Pp 292 – 295**