

ABSTRACTS of PH.D. THESES

**Selected abstracts of Ph.D. theses
submitted at Russian transport universities**

Bobrova, V.I. A Numerical method for calculating dynamic impact on shallow shells. Abstract of Ph.D. (Eng) thesis. [*Chislenniy metod rascheta pologih obolochek na dinamicheskie vozdeistviya. Avtoref. dis... kand. tekhn. nauk*]. Moscow, RUT publ., 2018, 19 p.

The thesis proposes an algorithm for calculating dynamic effects applied to shallow shells based on generalized equations of the method of finite differences of professor R. F. Gabbasov. According to the compiled methodology, a computer calculation program was developed, it was tested while solving a number of test problems and results were obtained for new variants, when the state of gentle shells under the action of various types of dynamic loads with different boundary conditions (as well as combinations of these conditions) becomes the subject of calculations.

The work was performed at National Research Moscow State University of Civil Engineering.

Boyko, S. P. Modeling and improving the efficiency of functioning of self-regenerating filters in the lubricating systems of marine diesel engines. Abstract of Ph.D. (Eng) thesis. [*Modelirovanie i povyshenie effektivnosti funktsionirovaniya samoregeneriruyushchikhsya filtrov v smazochnykh sistemakh sudovykh dizelei. Avtoref. dis... kand. tekhn. nauk*]. Vladivostok, Maritime State University named after admiral G. I. Nevelskoy, 2018, 26 p.

A model of two-stage filtering of oil through a pore structure of complex configuration with external and internal retarding sections has been developed, which allows to accurately calculate fineness, fractional coefficients and completeness of screening woven filter meshes of plain weave. The dimensionless dropout coordinate was identified, which makes it possible to simulate the suspension flow using a simplified scheme, and accuracy of the theoretical estimate of efficiency of oil purification by self-regenerating filters is improved using special tabulated functions. Performance indicators are formulated and a countercurrent regeneration model is created. Scientific and technical solutions have been proposed to improve the design of SRF and increase the efficiency of their work with centrifugal cleaners – centrifuges with pressure discharge and self-cleaning separators of flushing oil.

Brazhniy, A. I. Navigation safety of a caravan during sea and ocean tows of floating structures. Abstract of Ph.D. (Eng) thesis. [*Navigatsionnaya bezopasnost karavana pri morskikh i okeanskikh buksirovках plavuchih sooruzhenii. Avtoref. dis... kand. tekhn. nauk*]. Vladivostok, Maritime State University named after admiral G. I. Nevelskoy, 2018, 18 p.

The dissertation study identified the level of awareness in development of a project for offshore towing of a floating structure with signs of a «low sea-going» object and

showed ways to increase this awareness. An assessment of structural stability of the marine towing system for a similar object with stationarity of the towing process, as well as models for assessing safety of navigation when towing within the framework of linear assumptions and the model of the object stabilization mechanism in the position strip are proposed. A mechanism has been developed to select a sequence of priority decisions that ensure safety of maneuvering of the towing system in case of divergence with navigational hazards.

Golovchenko, G. V. Methods of resource-time optimization of the process of operational management of an airport in emergency situations. Abstract of Ph.D. (Eng) thesis. [*Metody resursno-vremennoi optimizatsii protsessa operativnogo upravleniya aeroportom v sboinykh situatsiyah. Avtoref. dis... kand. tekhn. nauk*]. St. Petersburg, SPSU CA, 2018, 22 p.

The conceptual analysis of the processes of interaction between the airport services and IT development made it possible to substantiate the need to develop a method for resource-time optimization of the order of departure of aircrafts and schedules for maintenance crews under operational management (OM) of an airport in a situation of technical failures. The task has been set and analytical models of resource-time optimization have been created, taking into account not only the state of resources changing in time, but also the location of aircraft at the apron. A new simulation model of the schedule of maintenance crews for a given order of departure of planes in normal and failing situations is different from the known models using Mathcad computing environment, which simplifies modification of efficiency criteria, baselines and simulation algorithms. Models and methods are implemented in AS «COBRA-2», which helps automate the processes of operational management of airport activities.

Kosykh, P. A. Development of the method for calculating light steel thin-walled profiles with an arbitrary shape of perforation during axial compression. Abstract of Ph.D. (Eng) thesis [*Razvitiye metodiki rascheta legkikh stalnykh tonkostennykh profilei s proizvolnoi formoi perforatsii na osevoe szhatie. Avtoref. dis... kand. tekhn. nauk*]. Moscow, RUT publ., 2018, 21 p.

The dependence of the carrying capacity of thin-walled profiles with non-standard perforation under axial compression on the dimensional parameters, configuration of the notches and the shape of the initial geometric imperfections, which allows us to more accurately predict the maximum permissible load, is established. An algorithm is developed for determining the «equivalent» geometric characteristics of profiles of different sizes with a non-constant cross-sectional shape to calculate the critical buckling strength of perforated profiles. Analytical dependences are obtained, allowing to calculate the bearing capacity of perforated profiles of complex geometry.

The work was performed at Perm National Research Polytechnic University.

Kovalev, R. A. Methods and algorithms for an intelligent system for recognizing the circuits of railway automatics and telemechanics. Abstract of Ph.D. (Eng) thesis [*Metody i algoritmy intellektusnoi sistemy raspoznavaniya skhem*



zheleznodorozhnoi avtomatiki i telemekhaniki. Avtoref. dis... kand. tekhn. nauk]. St. Petersburg, PSTU, 2018, 16 p.

A new model of pattern recognition is proposed, which formalizes the graphic description of an element of the schematic electrical diagram (SED), connection points with other elements, and the location of text attributes. The model allows to influence the recognition algorithm without retraining and changing its description. A method has been developed for searching SED text expressions and classifying them in accordance with the attributes of elements using cluster analysis methods. A block diagram of the SED recognition system of railway automation and remote control, describing the complete cycle of translating technical documentation from the original raster format image into an electronic object model, has been designed.

Matveeva, I. G. Economic justification of programs for improving business processes in railway transport. Abstract of Ph.D. (Economics) thesis [*Ekonomicheskoe obosnovanie program sovershenstvovaniya biznes-protsessov na zheleznodorozhnom transporte. Avtoref. dis... kand. ekon. nauk*]. Moscow, RUT publ., 2018, 24 p.

The approach to studying losses in transport company management processes was modified using lean manufacturing tools to achieve the target status of the Russian Railways holding company. Methodical recommendations have been formed for assessing the quality of lean production projects aimed at achieving the efficiency and safety of the transportation process. The method was proposed and the possibility of determining savings in overhead costs of a business unit of the transport holding company and the conditional savings from improving the efficiency of use of fixed assets was proven. To study the economic efficiency of projects to improve organization of transportation, a model has been adapted to use the method of expenditure rates for estimating elimination of losses in the end-to-end railway transport processes.

Morozova E. I. Integral assessment of innovative high-speed ground transportation projects. Abstract of Ph.D. (Economics) thesis [*Integralnaya otsenka innovatsionnykh projektov vysokoskorostnogo nazemnogo transporta. Avtoref. dis... kand. ekon. nauk*]. St. Petersburg, Admiral Makarov State University of Maritime and Inland Shipping, 2018, 23 p.

The concept of «innovative project of high-speed land transport» is formulated on the basis of generalization and meaningful analysis of the concepts «innovation», «innovative project», and «high-speed land transport». A classification of innovative projects of high-speed land transport is presented taking into account classification criteria for assessing their investment attractiveness. The basic principles for evaluating an innovation project in transport were determined, integral assessment of investment attractiveness of a high-speed land transport project was justified, a list of criteria and indicators for its evaluation was proposed, based on the interests of stakeholders and the main directions of strategic development of the national macroeconomic system.

The work was performed at Emperor Alexander I St. Petersburg State Transport University.

Tarasov, A. N. Control of asynchronous traction electric motors of a locomotive bogie in limit-set motion modes. Abstract of Ph.D. (Eng) thesis [*Upravlenie asinkhronnymi*

tyagovymi elektrodvigatelyami teleshki lokomotiva v predelnykh po stsepleniyu rezhimakh dvizheniya. Avtoref. dis... kand. tekhn. nauk]. Moscow, RUT publ., 2018, 20 p.

The author has developed a control method, a functional diagram and algorithms for operation of a traction motor drive of a locomotive with joint control of the bogie's AM at the adhesion limit. Mathematical and complex computer models of a TEM9N hybrid maneuvering diesel locomotive electric drive with a control system that implements the maximum adhesion forces under the joint control of AM of the bogie. The operation of TEP at the joint discontinuous control of ATD of the bogie when the adhesion conditions are changing, is analyzed. It is shown that the proposed control algorithms can partially compensate for the non-optimal design of the mechanical subsystem of TEP and ensure implementation of potential adhesion conditions by at least 90 %.

The work was performed at Bryansk State Technical University.

Tsvigunov, D. G. Interaction of seasonally freezing soils with the foundations of vertical pivotal elements. Abstract of Ph.D. (Eng) thesis [*Vzaimodeistvie sezonopromerzayushchikh gruntov s fundamentami vertikalnykh sterzhnevyykh elementov. Avtoref. dis... kand. tekhn. nauk*]. Moscow, RUT publ., 2018, 24 p.

During the study, a mathematical model of seasonally freezing soil was created, taking into account accumulation of migratory moisture in freezing clay soils and its influence on reduction of strength and deformation characteristics of base soils around vertical core elements during thawing. The resolving equation for the process of increment of the relative deformations of the soil is obtained. An exponential dependence of soil resistance to shear on its moisture is proposed. The relationship of the strength characteristics of the soil under vibrodynamic effects with the mode of its temperature is revealed.

The study was performed at Far Eastern State Transport University.

Zebilila, M. D.-H. Calculation and evaluation of effectiveness of vibration isolation systems with linear and nonlinear characteristics. Abstract of Ph.D. (Eng) thesis [*Raschet i otsenka effektivnosti sistem vibroizolyatsii s lineinymi i nelineinymi kharakteristikami. Avtoref. dis... kand. tekhn. nauk*]. Moscow, RUT publ., 2018, 24 p.

A calculation method has been developed, dependencies have been identified, and algorithms for creating vibration-proof systems with non-linear characteristics (additional reference constraint, viscous friction damper) using transfer and pulse transient functions as systems with one and two degrees of freedom are given. A method for calculating the horizontal-rotational oscillations of massive bodies with arbitrary kinematic effects is proposed. The amplitude-frequency characteristics of a system with a dynamic oscillation damper as a system with three degrees of freedom are constructed using a method based on the choice of generating equations.

The work was performed at National Research Moscow State University of Civil Engineering.

Compiled by Natalia OLEYNIK ●