

ABSTRACTS OF D.SC. AND PH.D.

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

Katskaev, A. A. Integration of shielding wire in traction power supply system with fiber-optic communication line. Abstract of Ph.D. (Eng) thesis. Rostov-on-Don, RSTU publ., 2018, 24 p.

A mathematical model is developed for calculating the electrical parameters of a traction network with a shielding wire for single-track and double-track sections, taking into account the geometric disposition of electric conductors relative to each other. In the presented model there are no assumptions about the equality of mutual inductive resistances between the «conductor-ground» contours, the rail circuits on a two-track section are considered separately. On the basis of experimental modeling, the conceptual recommendations for design of an OCTT cable for its operation in the traction network as a conductor of the reverse current are given, as well as the algorithm for selecting the cable of the OCTT for its operation as a shield wire. The system was named traction network with a combined screening wire (TN CSW).

Prokofiev, M. N. Improvement of technology of accelerated freight rail transportation. Abstract of Ph.D. (Eng) thesis. Moscow, RUT publ., 2018, 24 p.

The thesis discussed the new technology of accelerated freight rail transportation, providing for provision of transport services through free sale of pre-provided packages in the trains of the composition set; technology used for organization of freight transportation on conventional, speed and high-speed lines allows to calculate a plan for accelerated formation of freight trains with rational schemes of compositions. Calculations show the high efficiency of the new technology. The offered rack car can be useful beyond the framework of the innovation scheme.

Savin, A. V. Conditions for application of a ballastless track. Abstract of Ph.D. (Eng) thesis. Rostov-on-Don, RSTU publ., 2018, 40 p.

A comparative analysis of the characteristics of the ballast and ballast-free track concerning minimization of their maintenance is performed. To determine the possibility of using a ballastless superstructure, firstly, the calculation of (static and dynamic) conditions for reaching the first limiting state was made, and secondly, the empirical dependence of the track drawdown on the handled tonnage is approximated in order to find the conditions

for obtaining the second limiting state. It has been experimentally proved that the fiber-optic diagnostics system of the roadbed proposed by the author allows us to track the appearance and to measure the value of displacements of deep-lying layers that cannot otherwise be detected. Based on the results of the study, technical requirements for the ballastless track and its elements are justified.

Shubitidze, V. V. Determination of stability conditions for a continuous welded rail by an energy method taking into account the effect of trains. Abstract of Ph.D. (Eng) thesis. Rostov-on-Don, RSTU publ., 2018, 20 p.

The author showed that the impact of trains significantly affects the stability of a continuous welded rail and to develop a model for the loss of stability, one must clearly know the prerequisites for these assumptions. The parameters of resistance of gravel ballast to movement of reinforced concrete sleepers during the passage of trains have been experimentally determined. On the basis of the energy method, a mathematical model is proposed that makes it possible to estimate the conditions for the loss of stability by continuous welded rail under load and takes into account the boom size and the rate of its growth, which depend on the temperature of fastening the rail lashes. The last moment is regulated by permissible deviations identified during the study.

Zheleznov, M. M. Methods to improve traffic safety and prevent emergencies in rail transport using aerospace monitoring tools. Abstract of D.Sc. (Eng) thesis. Moscow, RUT publ., 2018, 48 p.

The author puts forward a scientific concept of track monitoring to prevent emergencies, which is based on the hypothesis that the operational factors associated with the growing intensity of the transportation process (heavy traffic, increased axle loads, large-scale infrastructure interference in the nature of the landscape, etc.) seriously influence the appearance of extensive deformations in the zone of railway sections. The model of application of methods of space monitoring together with traditional technologies is proposed, which provides for construction of a system of multi-level and long-term monitoring of places containing the potential danger of an emergency on the railway. The principal difference of the system lies in the complex processing of data obtained with the help of space and aviation surveys from unmanned aerial vehicles, combined with the results of field measurements and chronological information on the events of recent years. At the same time, the objects of control are evaluated according to the dynamics of the parameters with an accuracy of 0,1 mm per year for up to hundreds of kilometers, which is a new level for existing monitoring tools. ●

