ABSTRACTS OF D.SC. AND PH.D.

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

Arefiev, R. O. Methods for increasing the accuracy of GLONASS in the aerodrome zone by optimizing the location of the network of pseudo satellites. Abstract of Ph.D. (Eng) thesis. Moscow, MSTU CA, 2018, 24 p.

It is shown that the efficiency of air navigation support in the areas of remote aerodromes does not meet the modern requirements for the landing phase. Therefore, it is proposed to use GLONASS with a functional complement in the form of a network of optimally located pseudolites (PS).

To solve the problem of their placement, methods of direct search of zero order are used. Optimization criteria based on minimization of the average value of vertical geometric factor *VDOP* along the landing trajectory for a full (8-day) time interval are developed, as well as a method for selecting a single (quasi-optimal) PS location for the total period of GLONASS orbital grouping.

Brilko, A. A. Method of continuous monitoring of the purity of aviation fuel in the technological scheme of fuel supply of aircraft. Abstract of Ph.D. (Eng) thesis. Moscow, MSTU CA, 2018, 24 p.

The mechanism of fouling and filtration of aviation fuel in the nodes of the technological scheme of fuel preparation is studied, the dynamics of the change in the level of pollution during the passage through the chain of the aviation fuel supply system and the influence of the quality of aviation fuel purification on flight safety are developed. Dependences of the resource of filter elements on the water cut of aviation fuel have been revealed, on the basis of which a new control parameter has been introduced – the indicator of the «tightness» of the filter element. In view of the new control devices developed by the author, a method of continuous monitoring of the purity of aviation fuel for its preparation for use on aircraft is proposed, which allows to determine the efficiency of equipment and filters in real time.

Gorbunov, V. P. The method of maintaining the airworthiness of aircraft with an airborne digital complex in extremely low temperatures. Abstract of Ph.D. (Eng) thesis. Moscow, MSTU CA, 2018, 22 p.

A method of thermal compensation has been developed and experimentally tested, which provides a simple and reliable method for maintaining the specified thermal mode of operation of the avionics digital system and systems with the provision of constant readiness of aircraft for takeoff and the possibility of long parking in the hangarless conditions of extremely low temperatures in the airports of the Far North, Siberia and the Arctic.

On the basis of combining data on reliability of microelectronic devices and on the efficiency of digital equipment in the negative temperature region, a generalized dependence of reliability of digital equipment on temperatures in a wide range is compiled.

Kibovsky, V. T. Calculating and instrumental methods for controlling safety of laser radiation in the transport industry. Abstract of Ph.D. (Eng) thesis. Moscow, RUT, 2018, 28 p.

The author analyzed the state of the normative base of domestic and foreign laser safety systems in order to identify the existing contradictions and choose ways to resolve them. A generalized method for special assessment of labor conditions characterized by the action of laser radiation is proposed, based on the results of measurements and calculations of the maximum values of the hazard severity factor in the workplace. Calculation methods have been developed for assessing the degree of danger of laser beams, taking into account the specific interaction of radiation with the optical system of the eye; methods for estimating the degree of blinding by a laser beam, based on a new hygienic standard; circuit solutions for tools of instrumental safety control (laser dosimeter), as well as uniform dosimetric control methods at workplaces (with high reliability and reproducibility of measurements) have been also developed.

Korchagin V. O. Improving the traction qualities of diesel locomotives by the action of a constant magnetic field on the contact between the tribo-system of wheel–rail. Abstract of Ph.D. (Eng) thesis. Moscow, RUT, 2018, 24 p.

To estimate the efficiency of magnetization of the contact zone of a wheel with a rail, it is proposed to use the coefficient of magnetic overlapping of the contact in the form of the ratio of the area of the magnetic contact to the area of the contact spot. The magnetic contact of the wheel with the rail is a saturation region on the rolling surface of the wheel with magnetic induction greater than the induction of the initial saturation of the steel material. A mathematical model of the wheel profile is developed in the form of a trigonometric Fourier series. The distribution of the magnetic field in the contact zone of the wheel with the rail is studied, methods for organizing the magnetic flux on the locomotive are used when using devices with magnetic amplifiers of the coefficient of adhesion (RF patents are obtained on the devices). A computer software has been written that fixes the macrogeometric parameters of the contact zone of the wheel with the rail. Modes of magnetization of contact zones of wheels of a six-axis shunting diesel locomotive with rails are given for traction at low speeds.

Zavyalov, A. M. Increase of labor safety in railway transport on the basis of reducing human factor influence. Abstract of D.Sc. (Eng). Moscow, RUT, 2018, 46 p.

The formalization of the system «human–technical system–production environment» is carried out, which allows using mathematical modeling methods to analyze the influence of the human factor on production processes safety. An appraisal model corresponding to these new possibilities has been developed, which takes into account the anthropometric, physiological, psychosocial and professional characteristics of workers and employees of the industry. The author also proposed a method for forming profiles of traumatic occupations that presupposes control and correlation with them of the safety level of the work of immediate profile performers. The variants of solutions for identifying and assessing risks in the design and implementation of technological operations with the aim to reduce the negative impact of the human factor are substantiated; a model and methods for managing professional risks are provided, providing targeted adjustment of measures to protect personnel from injuries and other threats related to health and working capacity of people within railway transport. ●