BUILDING CONSTRUCTION, BUILDINGS AND STRUCTURES

PECULIARITIES OF FORECASTING CHANGES IN THE STRENGTH INDICATORS OF CONCRETE UNDER CONDITIONS OF LIMITED INFORMATION

M. N. Samokhina, G. D. Shmelev, A. N. Ishkov

Annotation. The article reveals an approach to solving the problem of determining the design strength of concrete, the strength of concrete laid down in the manufacture of the structure and the mathematical model, the time variation of the strength of concrete, taking into account its aging processes during long-term operation of a building or structure. Mathematically and statistically based solutions of these problems were proposed with the complete absence of any information from the project owner from the design and performance documentation on the characteristics of the concrete structures. The proposed approach to assessing the strength properties of concrete and predicting the residual service life of reinforced concrete structures has been repeatedly used to solve practical problems of predicting and justifying the estimated service lives of building structures of various buildings and structures.

Keywords: concrete class; concrete grade; statistical dispersion of strength; boundaries of the sample; forecasting.

TO THE QUESTION OF THE ACTUALIZATION OF THE NORMATIVE BASE IN THE FIELD OF THE SAFE OPERATION OF CONSTRUCTION OBJECTS

S. V. Medzhidov, O. A. Loskutova, E. R. Fokina, E. V. Dmitrieva

Annotation. The analysis of the regulatory and technical documentation governing the development of separate sections of the project documentation for the overhaul or reconstruction of buildings and structures of various functional purposes with the aim of ensuring their further safe operation is carried out. The features of the development of the section of design and estimate documentation «Requirements for the safe operation of a capital construction facility», developed on the basis of the requirements of SP 255.1325800.2016 «Buildings and Structures. Rules of operation. The main provisions». The issues of classifying the object to the categories of buildings (structures) depending on the operating mode are established. The necessity of introducing a uniquely defined term «operational mode» is justified, which allows not only to update the list of facilities with different operating modes, but also to help reduce the number of emerging disputes when establishing the operational mode of facilities that are building complexes that combine functional areas for various purposes, a combination of which not accounted for in the current regulatory documents. The conclusion is made about the need to improve the system of

technical regulation in construction, not only in terms of developing new sets of rules, but in terms of works on updating the already approved regulatory documents, from the point of view of excluding the possibility of a «double» interpretation of the provisions contained therein.

Keywords: safe operation; project documentation; regulatory documents; overhaul; reconstruction.

REPEATED USE OF CONSTRUCTION MATERIALS AND CONSTRUCTIONS

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Annotation. The issues of the duration of the use of building materials and structures in buildings with their proper maintenance are considered. Given the average service life of individual building structures. Existing demolition methods for dismantling and dismantling buildings of old buildings are considered. Studied the experience of the actual reuse of building materials and structures set forth in the works of other authors. An in-depth analysis of the possibility of reusing bricks, wood and concrete blocks of basement walls has been carried out. The requirements of regulatory documents for clay brick for use in the walls of buildings are shown. A comparison of the existing loads and efforts on the materials of the walls of low-rise buildings with wooden and reinforced concrete precast floor slabs of multi-core reinforced concrete slabs of factory production. The stages of masonry work and their characteristic internal efforts as a percentage of the destructive efforts are considered. Using the simplest calculations, it was proved that the strength of the old brick is sufficient for erecting walls of low-rise buildings (1…2 floors). Laboratory physico-mechanical tests of old bricks from the walls of a building built in the mid-19th century were carried out. The results obtained were fully confirmed by a preliminary analysis of the strength properties of the old clay brick. Showing the direction of the possible use of old bricks for load-bearing, self-supporting walls, decorative elements of decoration, with the device floors. The possibility of reuse of undamaged wood is shown. Given the main directions of the use of wood in the form of decorative elements, including for furniture. The possibility of using for the device of rough floors, as well as in the form of structures of intermediate floors, including load-bearing and decorative ones, is shown. Designated reuse directions and features of re-assembly of prefabricated concrete wall blocks.

Keywords: building construction; buildings and constructions; demolition; dismantling; recycling; reuse; brick; wood; concrete blocks.

ENGINEERING SYSTEMS AND COMMUNICATIONS

INFLUENCE OF ARTIFICIAL MICROCLIMATE IN INDUSTRIAL SPACES OF TEXTILE ENTERPRISES ON PHYSICO-MECHANICAL PROPERTIES OF PROCESSED FIBERS

A. I. Eremkin, I. N. Filchakina

Annotation. The article deals with the actual problem of the importance of creating the required parameters of the artificial microclimate in the textile industry by technological air conditioning systems in order to ensure the required moisture content of the processed textile fibers. The graphs of dependence of physical and mechanical properties of processed fibers on their moisture content and on the parameters of artificial microclimate (relative humidity and temperature) are presented. The advantage of the artificial microclimate and the influence of its main parameters (temperature, relative humidity and flow rate) on the moisture state of the processed textile materials are revealed. Studies were conducted for natural (wool, cotton), artificial (viscose, acetate fibers) and synthetic fibers (nylon, acrylic, polyester and other). It is proved that the creation of a technological air conditioning system and the maintenance of strictly controlled parameters of the artificial microclimate is a necessary condition for the production of high-quality textile products.

Keywords: air conditioning system; properties of textile fibers; textile industry; textile materials; moisture content.

FEATURES OF CALCULATION OF NATURAL VENTILATION OF LARGE AREAS

E. V. Sazonov, V. V.Shichkin

Annotation. The paper considers the use of aeration in rooms of large volume with thermal excesses. The main tasks to be solved during the design of aeration ventilation systems are identified, the assumptions and limitations made to simplify the solution of these problems are determined. The description of volume-planning and technological features of the industrial shops influencing efficiency of work of natural ventilation (aeration) is resulted. Recommendations on rational placement of the processing equipment serving as a source of heat are given. The theoretical basis and practical recommendations for the calculation of natural air exchange and design of devices that provide air exchange in a given volume on the example of a single-span one-story building with the location of aeration openings in the lower and upper zones are formulated. The calculated dependences for determining the equivalent areas of inlet and exhaust openings, as well as for the selection of the opening angle of the aeration opening flaps to provide a given air exchange are given.

Keywords: natural ventilation; aeration; air exchange; external fencing; velocity field; neutral plane.

THE INCREASE IN WASHING EFFICIENCY OF THE WATER HEATING SYSTEM, EQUIPPED WITH A TANK HEATING DEVICES

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Annotation. The causes of clogging of elements of heating systems equipped with capacitive heating devices are considered, which leads to an increase in hydraulic resistance, a decrease in coolant flow, a decrease in the average surface temperature of the heating device and a decrease in heat transfer of the radiator. The analysis of the existing method of washing the heating system and identified its shortcomings. A more qualitative method of washing the single-tube heating system by hydraulic method is proposed, which consists in the fact that to ensure effective washing of capacitive radiators, it is proposed to supply clean and remove contaminated water from different sides of the heating device. A wiring diagram-feed heating system-state devices, specifying the required elements and a description of the after-dovalidate actions to be undertaken when carrying out drilling works. The use of the proposed method allows to reduce the water consumption for washing the heating system, to reduce the washing time, to exclude the transfer of solid particles to other elements of the heating system, which allows to increase the reliability of its operation.

Keywords: capacitive heating device; blockages of the heating system; single-pipe system of water heating; heat transfer of the radiator.

ANALYSIS OF LOSSES OF PRESSURE IN THE NETWORK OF AIR DUCTS DURING REPLACEMENT OF SECTIONS WITH THE APPLICATION OF EQUIVALENT DIAMETER FORMULAS

S. A. Antipov, D. V. Lobanov, L. S. Korovina, R. A. Buturlakin

Annotation. In the development of ventilation systems with mechanical motivation of air movement are widely used ducts of rectangular and circular cross sections. However, when implementing projects, it is sometimes necessary to replace the configuration of air ducts: from rectangular to round or Vice versa. When replacing the sections of air ducts are often guided by the formula «equivalent diameter», not taking into account the specifics of the unified model series and aerodynamic characteristics of shaped products. In most cases, as practice shows, the aerodynamic calculation is not repeated. In the technical literature there are various formulas for calculating the «equivalent diameter». The authors conducted research to identify the formula that is most suitable for the conversion of diameters when changing the shape of the air duct. The results of aerodynamic calculation of supply and exhaust ventilation systems when replacing the rectangular section of air ducts with a round one are presented. The graphs of changes in pressure losses in the sections of the duct network of the systems under study, the analysis of pressure losses in the duct network of different geometric configurations (rectangular, round). Recommendations on the use of «equivalent diameter» calculation formulas for the problems encountered in the practice of ventilation systems design are formed.

Keywords: equivalent diameter; pressure loss; replacement of rectangular cross-section by round; air duct cross-section.

CITY. RECONSTRUCTION, RESTORATION AND LANDSCAPING

ANALYSIS OF LEGISLATIVE AND REGULATORY DOCUMENTATION ON SURVEY, RECONSTRUCTION AND CAPITAL REPAIR OF CONSTRUCTION OBJECTS

S. V. Medzhidov, O. A. Loskutova, E. R. Fokina, E. V. Dmitrieva

Annotation. The analysis of the normative-technical documentation regulating the issues of determining the composition and scope of work during the overhaul or reconstruction of buildings and structures of various functional purposes in order to ensure the possibility of their further safe operation has been carried out. The features of the development of project documentation for the reconstruction (overhaul) of buildings and structures based on the conclusion of the assessment of the actual technical condition of the facilities in operation are considered. There are discrepancies in certain provisions of the current system of normative-technical documentation regarding the attribution of the conclusion on the actual technical condition of buildings and structures to the types of engineering survey works, on the preparation of project documentation, on construction, reconstruction, and overhaul of capital construction projects that affect safety capital construction objects. The conclusion is made about the need to improve the system of technical regulation in construction not only in terms of developing new sets of rules, but also works on updating the already approved regulatory documents from the point of view of excluding the possibility of "double" interpretation of the provisions contained in them.

Keywords: technical inspection; regulatory and technical documentation; reconstruction; overhaul; safe operation of real estate.

ECOLOGY AND SAFETY OF THE URBAN ENVIRONMENT

THERMALDISPOSAL OF SOLID DOMESTIC WASTES

Yu. Kh. Khabibullin, O. B. Barysheva

Annotation. The main problems associated with the disposal of solid household and industrial waste. Recycling and disposal of waste is one of the most pressing problems not only in our country, but throughout the world. In economically developed structures, less and less household waste is transported to special landfills, and more and more are processed by industrial means. Every year in our country approximately 140 million cubic meters of waste are generated, of which only 3% is recycled, which is completely unacceptable. The most effective way to recycle waste is thermal. It allows almost ten times to reduce the amount of waste transported to landfills, moreover, the unburned residue does not contain organic substances that cause rotting, spontaneous fire and the danger of epidemics. Nowadays,

the focus is on garbage-processing plants, which not only burn waste, but also process the heat released during this process into energy. To achieve this goal, an installation for high-temperature processing of municipal solid waste has been developed and a description of the method of operation of the installation is given. A method of waste disposal with the production of additional energy is proposed.

Keywords: burning of waste; dioxins; furans; recycling; municipal solid waste.

ANALYSIS OF THE ECOLOGICAL SITUATION IN THE AREA OF LOCATION OF LLC «POLITEKHNIK-SERVIS» IN AZOV, ROSTOV REGION

L.V. Dikova, N. S. Samarskaya

Annotation. The main factors affecting the state of the environment in the area of location of LLC "Polytechnic-Service" Azov, Rostov region are considered. The main pollutants, the source of which is the studied enterprise, are listed the main factors affecting the spread of pollutants in the atmosphere. As the main factors the climatic characteristics of the enterprise location area, the state of atmospheric air, soils, as well as physical factors of influence are analyzed. A quantitative calculation of these factors, as a result, the value of the indicator of a comprehensive assessment of the environment. The conclusion about the environmental situation in the area of location of LLC "Polytechnic-Service" Azov, Rostov region.

Keywords: state of the environment; atmospheric air; environmental safety; ecological situation; comprehensive assessment.

ROAD TRANSPORT, AGRICULTURE AND CONSTRUCTION MACHINES

IMPROVING THE ACCURACY OF SIGNAL TRANSMISSION IN THE SYSTEM OF REMOTE CONTROLLING MACHINES OF THE ROAD-BUILDING COMPLEX

A. A. Kononov, A. D. Kononov

Annotation. Various methods of noise suppression are considered and the characteristics of the impact reduction in the radio channel of the system of remote controlling the road-building complex machines are compared. The numerical values of the characteristics of suppression and deterioration of resistance to non-impulse noise due to the expansion of their spectrum under the action of the system of suppression of impulse noise are obtained. Based on the analysis of the data, a scheme of the receiver with the possibility of using different methods to improve the accuracy of signal transmission in the information system is proposed. The developed scheme allows us to investigate in the laboratory the possible methods of suppression of distortion of the transmitted information signal, creating a variety of noise situations.

Keywords: technological machines; road-building complex; signal transmission; control system; accuracy.

ECONOMICS AND ORGANIZATION OF CONSTRUCTION

ECONOMIC AND ORGANIZATIONAL ASPECTS OF SEPARATE COLLECTION OF SOLID COMMUNAL AND LARGE-SIZED WASTE

F. F. Gaev, M. L. Rakhmanov, S. I. Shkanov, A. M. Yakushina, E. S. Tskhovrebov, E. G. Velichko

Annotation. Currently, our country is lagging far behind in terms of utilization of solid municipal waste (MSW) and bulky waste (KGM), extraction of valuable components from such waste and the use of secondary material resources from the leading countries of the EU, the USA, and Japan. One of the main reasons is the lack of a cost-effective system for managing waste and secondary resources. There is a deterioration in the environmental situation associated with the closure of landfills for municipal solid waste, the growth of unauthorized landfills. This problem determines the need to find new scientific and methodological approaches and practical solutions not only in the planning of waste disposal infrastructure facilities, but also in creating an economically efficient system for separate collection and pretreatment of MSW and KGM in the sources of their formation, justification and optimization of the standards for the accumulation of these wastes for citizens. The existing system of organizing the collection of useful components of MSW does not stimulate the residents to separate the collection of secondary resources. Taking into account the urgency and significance of the problem, this article presents reasonable proposals, methodological approaches to the organization and planning of measures for the creation and development of an integrated system of separate collection and preprocessing of waste data in the municipal infrastructure system of Russia. In the work, based on the results of the conducted research and surveys, approaches to the organizational, technical and economic rationale of solving the actual problem affecting all layers of Russian society are proposed: optimization of the system for calculating the accumulation rate taking into account various factors and conditions; reducing the financial burden on the population in terms of tariffs for the removal and disposal of garbage; economic incentives for the population to carry out separate collection and pre-treatment of components of solid municipal and large-sized waste to the level of demanded secondary material resources for the production of products, services, energy.

Keywords: communal infrastructure; economic regulation and incentives; secondary material resources; municipal solid waste; bulky waste; waste accumulation rate; separate collection and treatment of waste.