BUILDING CONSTRUCTION, BUILDINGS AND STRUCTURES

EXPERIMENTAL DETERMINATION OF THERMOPHYSICAL PROPERTIES OF HEAT-INSULATING MINERAL PLATE BY METHOD OF NON-DESTRUCTIVE TESTING

M. A. Vidiukov, N. A. Namestnikov, A. V. Kovylin

Annotation. The description of the application of the developed method of non-destructive testing to determine the thermal characteristics of building and heat-insulating materials is given. Experimental studies of the thermophysical properties of the material have been carried out according to the developed method. The object of the study is a mineral wool sample. Experimental studies were carried out without disturbing the structure and integrity of the samples. Based on the data obtained in the course of two experimental studies, graphs of temperature changes in the sample versus time were plotted. The thermal conductivity coefficient was calculated and the results obtained were compared with the passport data of the test sample.

Keywords: thermophysical properties; unbrakable control; coefficient of thermal conductivity; thermal diffusivity.

OPTIMIZATION OF TECHNOLOGICAL POST-TENSIONING PROCESSES UNDER CONSTRUCTION CONDITIONS

Y. R. Abdullina, T. R. Barkaya, A. V. Gavrilenko, P. V. Kulyaev

Annotation. The article presents the results of research of construction processes of post-tensioned concrete floor slab using the «monostrand» system. As part of the research, the task was set to find optimal conditions for reducing the time of post-tensioning, minimizing the additional non-stressed reinforcement consumption, ensuring the required transfer strength of concrete, and taking into account the start time of forms dismantling. In the course of the work, a number of parameters were considered that determine the conditions and post-tensioning procedure. The bearing strength calculation of the anchor installation zones made it possible to compare received concrete bearing loads with the maximum forces perceived by different classes of wire-rope reinforcement. As a result, graphical dependencies were derived that allow choosing the optimal combinations of concrete and prestressing reinforcement classes, excluding incomplete material strength characteristics using.

Keywords: unbounded post-tensioning system; prestressing technology in construction site conditions; construction time optimization; post-tensioning, concrete hardening time.

ENGINEERING SYSTEMS AND COMMUNICATIONS

INCREASING THE ENERGY EFFICIENCY OF THE SYSTEM HEAT SUPPLY IN ARDATOV

A. V. Enivatov, V. E. Boykov, I. I. Artemov

Annotation. The urgency of the work performed to improve the energy efficiency of the district heating systems in the city of Ardatov is substantiated. Energy efficiency assessment and performance analysis were carried out. The perspective directions of modernization of the district heating systems are considered. The routing of the combined sections of the heating network was selected and the hydraulic regime was developed. The block diagram of the power unit has been developed, which includes a boiler room, a gas piston unit and a gas generator unit.The gas generator plant produces generator gas from solid fuel and supplies this gas to the boiler room and gas piston plant, respectively, to generate heat and electricity. The generated energy is supplied to the consumer and directed to the own needs of the boiler house and the gas turbine plant, as well as to the own needs of the gas generator plant (to the line for solid fuel preparation and gas purification). In this case, in certain modes and periods of the year, heat release from the production of generator gas can be sent to the consumer of thermal energy.

Keywords: heat supply systems; gas generating unit; power unit; energy efficiency; specific fuel consumption; boiler room; hydraulic mode.

COMPARATIVE ANALYSIS OF HYDRAULIC CHARACTERISTICS OF STEEL AND POLYETHYLENE PIPELINES WHEN OPERATING IN HEAT SUPPLY SYSTEMS

P. P. Kondaurov, N. A. Niklyaeva

Annotation. The possibility of interchangeability of pipes of steel water and gas pipelines as per GOST 3262-75 and electric welded straight-joint as per GOST 10704-91 for polyethylene pipes as per GOST 32415-2013 in the system of hot water supply and heat networks is considered. The task is to determine equivalent diameters of steel and polyethylene pipes. To achieve the set task, the procedure for determining specific pressure losses on friction of both types of pipes, as well as the effect of equivalent roughness on specific losses is given, then hydraulic calculations of the presented types of pipes in the range of diameters: from 15 mm to 150 mm according to GOST 3262-75, from 20 mm to 159 mm according to GOST 10704 91 and from 16 mm to 160 mm according to GOST 32415-2013 are made. On the basis of the obtained calculations, six graphs of the dependence of specific head losses on coolant flow are built. A conclusion was formed with a recommendation for equivalent replacement of steel pipes with polyethylene pipes while preserving the hydraulic characteristics of the network.

Keywords: steel pipelines; polyethylene pipelines; water discharge; specific losses.

RATIONALE FOR THE USE OF ETHYLENE GLYCOL IN VENTILATION SYSTEMS WITH VARIABLE AIR FLOW

V. V. Shichkin, M. N. Zherlykina, K. V. Garmonov, S. A. Solovyov

Annotation. The relevance of the use of ethylene glycol as an intermediate heat carrier in the ventilation system during the processing of supply air is justified. a description of the operation scheme of the cooling system with an intermediate heat carrier at a variable flow rate of supply air is presented. On the Id-diagram of the state of humid air, the construction of air treatment processes in the central air conditioner for all purposes of the transformed space is performed. the need for cooling and dehumidification of the supply air in all operating modes is established. In order to determine the maximum possible load on the elements of the building's air conditioning system, the type of room with the highest supply air consumption was selected and the air treatment process was plotted on an Id diagram at different outdoor temperatures. A method for calculating the parameters of the cooling medium is developed and graphs are constructed that allow us to establish the relationship between the parameters of the heat exchange equipment and the purpose of the room. Regularities in the change in the parameters of the heat and cold carrier when regulating the operation of the system depending on the change in the load on it are revealed. The operating ranges of the proposed scheme of air treatment with an intermediate heat carrier in the warm period of the year with a variable flow rate of the treated air and various parameters of the outdoor air are given. Based on this, the possibility of drawing up an algorithm for automating the ventilation system adapted for cultural and entertainment buildings is justified.

Keywords: heat exchanger; ethylene glycol; cold carrier; intermediate heat carrier; variable air flow rate; temperature.

THE INFLUENCE OF THE THERMAL PROTECTION CHARACTERISTICS OF THE HEAT NETWORK ON THE TEMPERATURE MODE OF THE HOT WATER SYSTEM

M. S. Kononova, Yu. A. Vorob'eva, A. V. Zabara

Annotation. The object of the research is the intra-district distribution network of the centralized hot water supply system. The relevance of estimating the influence of heat engineering characteristics of heat pipelines on the temperature regime of the end user is shown. The results of calculations for determining specific heat losses for pipes of different diameters are presented. The calculations were carried out for two variants of the thermal network structures: a gasket in an impassable channel and insulation made of mineral wool; a channel-free gasket with insulation made of

polyurethane foam. A significant difference in the value of specific heat loss between the compared variants is shown. Calculations were made for the change in water temperature during transportation. It is established that the improvement of heat-shielding properties of heat pipelines does not significantly affect the change in the temperature of hot water at the end user.

Keywords: hot water supply; heat loss; heat network, temperature regime.

CITY. RECONSTRUCTION, RESTORATION AND LANDSCAPING

THE INFLUENCE OF WESTERN AND EASTERN TRADITIONS ON THE ELECTRIC ARCHITECTURE OF SAMARA LATE XIX - BEGINNING XX CENTURY

I. A. Kotenko

Annotation. The article examines styles of wooden residential buildings that are exotic for the Russian Volga city of the late 19th century - early 20th century. In the wooden architecture of the Volga city of Samara of this time, for the most part, imitations of the folk traditions of Russian wooden architecture, which were studied in detail by various authors, prevailed. Among the rare examples of "exoticism" are known merchant dachas in the «neo-Moorish» spirit. However, unusual urban buildings, which have features of the influence of Eastern (Japanese-Chinese) and Scandinavian architecture, have practically not been studied. There are not so many of them in Samara, but they are interesting precisely for their unique characteristics. The purpose of the article is to analyze the formal features of buildings of the eclectic and modern period that are not typical for Samara. First of all, buildings with clear signs of imitation of Western and Eastern architecture are examined in order to establish selected models for imitation. First of all, the article notes the distinctive formal and style features of architectural forms in the form of roof finishes. The study uses methods of comparative and architectural analysis of local buildings and possible authentic architectural role models. The conclusion is made about the partial use of eclecticism in local architecture not only of exemplary projects in the style of classicism and Russian wooden architecture, but also of well-known eastern and western forms of architecture.

Keywords: Samara; wooden architecture; formal and style features; eclecticism in architecture; modernist style; oriental influences; Scandinavian Norwegian church architecture; Western European traditions.

PANDEMIC FACTOR FOR THE DEVELOPMENT OF TERRITORIAL SETTLEMENT SYSTEMS

V. V. Fedorov, A. V. Levikov, D. A. Khanygin

Annotation. The multifaceted aspects of the influence of the pandemic factor on the processes of development of territorial settlement systems are considered on the example of domestic and foreign agglomerations. The task of identifying available legal measures for regulating the existing canons of urban development of the country is being solved with the aim of updating and adapting them to new challenges of society. The dependence of the density of populated areas, stimulating the manifestation of agglomeration effects, to the complexity of the sanitary and epidemiological situation in them is given. The study took into account not only population density, but also leisure consumption of urban space, traffic flows, and lifestyle. Possible options for the step-by-step adjustment of the domestic regulatory framework for urban planning are analyzed. The urgency of the formation of polycentric urban agglomerations and the limitation of the growth parameters of monocentric agglomerations are shown. A number of recommendations and provisions have been formulated, which should be rethought and introduced into the regulatory framework of architectural and urban planning. Research in this area will continue, but the conclusions formulated will help a high-density spatial planning system be more resilient to emergencies.
Keywords: urban planning; building renovation; settlement system; pandemic.

CURRENT ISSUES AND FUNDAMENTAL DESIGN CRITERIA EQUESTRIAN SPORTS COMPLEXES IN the City of VOLGOGRAD

N. N. Antonova, A. V. Vilgelm

Annotation. The article deals with the actualization of the issue of designing equestrian complexes as multifunctional objects that affect the social, economic and cultural spheres of society. The need for this research is due to the lack of an object in the Volgograd region that fully meets the requirements of society and trends in the architecture of modern equestrian sports complexes. The results of the analysis of the existing architecture and infrastructure of objects of this specialization in Volgograd are presented. Particular attention is paid to the problems identified in the analysis, which is based on the basic design criteria for equestrian sports centers in this region.
Keywords: equestrian center; architecture; infrastructure; multifunctional center; Volgograd; horse riding; equestrian sports; hippotherapy.

ECOLOGY AND SAFETY OF THE URBAN ENVIRONMENT

DEPENDENCE OF THE AVERAGE ENERGY ON THE POSITION OF THE NOISE SOURCE IN A DISPROPORTIONATE ROOM

A. I. Antonov, N. P. Merkusheva, T. S. Yarovaya

Annotation. There are moving sound sources in rooms with a large number of people and in industrial premises. The calculation of sound fields in such cases requires complex calculations. It can be significantly simplified if you get noise level drops depending on the distance between the noise source and the calculated point. The influence of the noise source position is taken into account as an addition to the average sound energy density. This article examines the change in the average level of sound energy in rooms of different proportions and sound-absorbing characteristics of fences. The conditions and zones of premises within which the movement of the noise source does not affect the value of the average sound energy and the declines in noise levels are determined. Verified by numerical obtained results show the dependence of the average reflected energy density on the position of the noise source relative to the fences. Approaching the noise source to a surface lined with an effective sound-absorbing material reduces the average reflected energy density or acoustic power of the noise source by 2-3 dB. The results of this article create prerequisites for the development of a simplified method for calculating sound energy levels in rooms with moving noise sources.

Keywords: reflected sound; sound absorption; long room; flat room; objects with a mass presence of people; moving noise sources.

ROAD TRANSPORT, AGRICULTURE AND CONSTRUCTION MACHINES

IMPROVEMENT OF TRAM SERVICE'S ORGANIZATION IN TERMS OF YEKATERINBURG

E. A. Lapteva, L. V. Bulavina

Annotation. In this article, based on on-site inspections, the main disadvantages of the tram service’s speed rate in Yekaterinburg, its low efficiency associated with the lack of ensuring the priority of movement are considered. There are presented the on-site inspections’ results of speeds and time consumption. The measurements were carried out on the two most loaded tram lines, which have both separate and one-level sections with the carriageway. The survey of the tram movement mode was carried out both in the morning and evening hours, and in the hours when the activity of motorists is minimal. There are some graphs characterizing the comparison of speed imposition and time expenditures under different traffic conditions. Also there are proposed measures for organizing the tram service’s priority on the track sides and at signaled crossings, allowing to improve the speed rate and efficiency.

Keywords: speed; delays; tram service; tram service’s priority; improving the tram travel’s efficiency.

MODERN PROBLEMS AND TRENDS IN HOUSING MANAGEMENT

N. M. Lebed, M. E. Dement'eva

Annotation. The main problems associated with the interaction of management companies with owners of residential premises of apartment buildings and suppliers of housing and communal services are considered. The task was set to improve the quality of the housing stock. Causal relationships of problems in the management and maintenance of apartment buildings have been established, the key ones of which are low competitiveness in the management of housing stock, an increase in debt to utility providers, underdevelopment of legal and legislative regulation of the activities of management companies, legal illiteracy of the population, unjustified increase in prices for housing and communal services, causing dissatisfaction on the part of apartment building owners. The description of the advantages and features of various methods of management of apartment buildings is given. To achieve the goals set to improve the quality of housing stock operation, a list of measures has been proposed that will help build more effective relationships between all participants in the operational process and level out existing problems in the work of management companies when interacting with homeowners, thereby ensuring the required quality of housing and communal services.

Keywords: technical operation; housing and communal services; management company; legal and legislative regulation.