JUXTAPOSITION OF DETERMINATION OF STRESS INCREASE METHODS IN TENDONS OF POST-TENSIONED CONCRETE BEAMS

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Annotation. Calculation methods of determination of stresses in unbonded tendons in ultimate work stage of post-tensioned beam are considered. This ultimate stress is using in strength capacity calculations of post-tensioned constructions. Accurate determination of its value is helpful to make economical and reliable design decisions. Results of calculation of value of ultimate stress in post-tensioned tendons are given. Initial data for calculation was taken from samples of beams which was used in bending test that was made before. During this bending test there was measures of stress in unbonded tendons by devices made with using of strain gauges. Results taking by different calculation methods are juxtaposed with each other and with experimental data. Because of comparative analysis conclusion about accuracy and applicability of calculation methods which was considering in this paper are made.

Keywords: post-tensioning; tendon; ultimate stress in unbonded prestressed tendons; bending test; structural analysis program; linear mechanics of materials.

TO THE ISSUE OF DETERMINING THE ACTIVE PRESSURE FROM THE FIBER-REINFORCED SOIL BACKFILL ON THE RETAINING WALL

A. S. Grishina, I. N. Popova

Annotation. The using fiber-reinforced soil as a backfill for retaining structures reduces the horizontal pressure due to the increased strength characteristics of fiber soil. Reducing the backfill pressure on the retaining wall abbreviates the consumption of materials and the cost of building. The article is dedicated to the issue of determining the active pressure from the fiber-reinforced soil backfill on the retaining wall. In the article two methods of calculating are proposed. The first method is based on retaining walls design normative documents and the “discrete” model of the fiber-reinforced soil proposed by Zornberg. This model use for determine the strength characteristics of the fiber-reinforced soil, it based on the independent characteristics of the fiber and soil. The second method relies on the model of the fiber-reinforced soil developed by Michalowski. The model presents the method for determining pressure based on the kinematic approach. The active pressure from the fiber-reinforced soil backfill are determined according to the proposed methods. Sand reinforced with polypropylene fibers adopted as fiber-reinforced soil backfill. The calculation is made for sand with a specific cohesion of 3 kPa and for perfectly

flowing soil The results of calculation by the described methods are represented. The second method of calculation does not take into account the specific cohesion of the soil and the geometry of the design scheme, which limits its appliciability. The article concluded that experimental confirmation and further research are necessary to determine the applicability and improvement of the described calculation methods.

Keywords: fiber reinforcement; retaining wall; backfill; active pressure.

INVESTIGATION OF THE STRESS-STRAIN STATE OF ELEMENTS OF THE REFERENCE NODE OF THE CONSOLE IN THE PC ANSYS

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Annotation. The article presents the results of computer simulation of the upper support node point of the cantilever of the building with the console removal of floors. The stress-strain state of the elements of the unit, taking into account the stages of installation of steel-concrete structures. The solid jobwas solvedthrough the Ansys PC in a linear formulation of the tasks. Efforts at the junction are taken on the results of static calculation of the model of the frame of the building with the console floors in the Lira PC. Analysis of the simulation results showed that the concreting of the head increases not only corrosion and fire resistance, but also the stability of the shelves and walls of metal profiles.

Keywords: reference node of the console; ansys; stress-deformed state; console; computer program; joint.

ENGINEERING SYSTEMS AND COMMUNICATIONS

TECHNICAL JUSTIFICATION FOR RECONSTRUCTION OF URBAN SURFACE FLOW DRAINAGE SYSTEM

M. S. Kononova, M. G. Kalugina, Y. Yu. Pirogova, S. A. Romanenko

Annotation. The analysis of the structure of surface flow water disposal systems is performed. It is shown that of existing separate drainage systems do not match the requirements of ecological safety. The review of the technical equipment for organization of surface flow treatment is carried out, the summary characteristic of the block local treatment facilities produced by various manufacturers is made. The authors have developed proposals for the reconstruction of existing urban separate drainage systems. Two options of scheme solutions are proposed: individual or group water separation chambers. The first option involves the installation of an individual water separation chamber after each rainwater receiver. The second option is based on the flow combination from several rainwater receivers and their direction to a group water separation chamber. The proposed options of reconstruction assume the preservation of existing drainage network collectors for discharging

wastewater treatment facilities during intense precipitation. The main factors influencing the development of the scheme solution of the reconstruction option are determined. Recommendations on the scope of the proposed circuit solutions taking into account the features of the equipment used are given.

Keywords: surface water flow; local wastewater treatment facilities; separate drainage system.

THE STUDY OF SLUDGE DRYING OF SLUDGE BEDS UNDER CYCLIC FREEZING

A.N. Tyanin, N.A. Kuznetsov

Annotation. The article reflects the relevance of the issue of intensification of sludge dewatering on the sludge plots of wastewater treatment plants. A list of sources reflecting material on the issue of intensification of sewage sludge dewatering is presented. An attempt has been made to explain the process of separation of a two-phase medium into free moisture and a highly concentrated precipitate. The mechanism of separation of solid and liquid phases is shown, which leads to the accumulation of a layer of compacted sludge at the bottom of the structure in the form of a sludge layer located on the opposite side relative to the heat exchange surface. The parameters that determine the moisture output of compacted excess activated sludge are specified. The most effective reduction of the specific filtering resistance of excess activated sludge at a temperature of 5…10 °C was confirmed. A decrease in the resistivity of filtration after threefold freezing of sewage sludge followed by their thawing was recorded. The greatest efficiency of gravitational filtration of sediment through the layer of the paper filter «white ribbon» was revealed during the initial phase separation period. An improvement in the dynamics of filtering sediment with respect to sediment that has not been subjected to freezing has been recorded. The article confirms the effect of freezing the sediment on increasing its moisture yield.

Keywords: compacted excess activated sludge; sediment filtration resistivity; freezing; moisture recovery; sludge moisture.

METHOD FOR CALCULATING HYDRAULIC CHARACTERISTICS FOR ONE TYPE OF LOCAL RESISTANCE OF COMPLEX DESIGN

E. V. Chesnokova, T. N. Sautkina, V. A. Makeev

Annotation. This paper proposes a method for determining losses in a new installation for water magnetization — multiple radial spreading of fluid between the flat surfaces of permanent ring magnets. they pass the same trajectories before leaving the local resistance and meet the same local resistance. The calculations do not take into account the interaction of the streams and the mutual influence of local

resistances - these features are taken into account by correction factors after experiencing experimental testing of this installation on a hydraulic test bench. It is especially convenient to use this method if the structure has an axis of symmetry (radially symmetric). The method outlined in this paper allows in some cases to determine losses in local resistances of complex construction. The proposed method is experimentally tested and can be applied in practice.

Keywords: magnetization; permanent ring magnets; local resistance; pressure loss; the mutual influence of resistance.

EXPERIMENTAL JUSTIFICATION OF THE NEED FOR DEVELOPMENT OF VENTILATION SYSTEMS IN EDUCATIONAL AUDITORIES FOR RECONSTRUCTION OF PREMISES

A. N. Pertsev, V. A. Kaminskaya, D. V. Lobanov, K. V. Garmonov

Annotation. The article discusses the need to develop ventilation systems in classrooms for the reconstruction of premises (for example, the audience of one of the universities in Voronezh). The purpose of the study is to assess the quality of the air environment and its impact on the health and performance of people in the room during one session. Often, in most of the premises of this kind, required supply and exhaust ventilation systems are missing or not working properly.

It should also be noted the constantly changing stringent requirements for the arrangement of buildings with engineering systems: heating, ventilation, smoke protection, fire alarms, etc. The authors carried out an experimental study to assess the state of the air environment in the room of mental work. It was established that the values of the studied parameters of the air environment changed in different percentages: the temperature of the internal air increased by 13 %, the relative humidity – 34.8 %, and the concentration of carbon dioxide increased by 405 %, i.e. 4 times the original value. It should be noted that the above-mentioned changes in the microclimate parameters caused the following complaints of students: drowsiness, headache, worsening of attention, inability to fully concentrate on the educational process, stuffiness, dizziness, as well as reduced performance. The results obtained, based on studies of the effect of CO_2 on humans, do not contradict the numerous data of domestic and foreign authors: in the process of increasing the concentration of carbon dioxide in the indoor air, a negative impact on the well-being and performance of students engaged in mental activity was revealed.

Keywords: air quality; carbon dioxide concentration; heat and humidity mode of the room; mental work.

CITY. RECONSTRUCTION, RESTORATION AND LANDSCAPING

PUBLICSPACES OF RESIDENTIAL DEVELOPMENT AND OFFERS OF THEIR REORGANIZATION

T. V. Mikhailova, N. A. Razmakhnina, D. V. Shelemin

Annotation. At present, with a high pace of housing construction in cities, the modern method of designing urban areas does not take into account the opinion of the end user, his true problems and needs, is not viable. The quality and environment of residential areas does not meet the principles of comfort and compactness. The article considers the analysis of the existing building with concrete examples, provides examples of participatory reorganization of the urban environment, when communication is built between residents, government officials, business and local communities.

Keywords: territorial community; building; public space; housing; case studies; complicity.

ECOLOGY AND SAFETY OF THE URBAN ENVIRONMENT

CLIMATIC CLASSIFICATION OF URBAN LANDSCAPES (ON THE EXAMPLE OF VORONEZH)

I. V. Popova

Annotation. The influence of the urban environment on climatic conditions is determined by the peculiarities of the geographical location of the city and its landscape structure. The landscape-geographical concept of studying the microclimatic differentiation of the urban environment considers the city as a set of landscapes of varying degrees of anthropogenic transformation that affect the meteorological regime of the surface layer of the atmosphere. The article considers the possibility of studying the microclimatic features of the territory of cities using the landscape-geographical approach and geoinformation-analytical methods for assessing the properties of the underlying surface, aimed at the allocation of climatopes and description of microclimatic differences in their boundaries, which are determined by the morphometric characteristics of the building, the nature of the improvement of its territory and the intensity of anthropogenic load on the environment. The climatic classification of urban landscapes is carried out and the map of climatopes of the territory of Voronezh is constructed. As parameters for determining the climate, the following were estimated: share of territory with a specific type of underlying surface; the indicator aspect ratio; vegetation cover ratio. According to the results of geoinformation analysis and climatic classification of urban landscapes in the city of Voronezh, only 10 classes of climatopes were identified: residential climatop of high-rise, residential medium-rise, residential low-rise, industrial, utility and warehouse, transport, agricultural, grassland, forest, aquatic.

Keywords: microclimate; klimatop; anthropogenic landscape; urban climate; GIS analysis.

IDENTIFICATION OF ENVIRONMENTAL ASPECTS UNDER CONSTRUTION OF OIL AND GAS COMPLEXES

Yu. A. Vorob'eva, Yu. A. Nacharova, V. A. Kunchenko

Annotation. The creation of any objects of the oil and gas industry is accompanied by the identification and assessment of the significance of the environmental aspects of the enterprise. The authors have studied modern scientific approaches to the problem of greening the economic activity of enterprises and justified the expediency of using environmental control in the practice of environmental management. The paper substantiates the need for ranking the elements of the activities of construction organizations in the construction of oil refining complexes according to the significance of their environmental impact. One of the solutions for assessing the impact on the components of the environment and effective management at the present stage is the introduction of environmental management in an organization based on the standards of PJSC Gazprom. The paper deals with environmental issues in the construction of an oil and gas complex in the Tyumen region, taking into account the specifics of construction work. The authors determined a general algorithm for identifying and assessing the significance of environmental aspects: certain areas were distinguished, differing in production processes and nature of environmental impact, types of impacts characteristic of a construction company. For the projected oil and gas complex, the identification of environmental aspects was carried out, significant aspects were identified and impact indices were calculated for each of them. The criteria are given, according to which there was an assessment in points of indicators characterizing the amount of pollutant entering the environment, the amount of resource consumption, the amount of physical impact, indicators characterizing the nature of the impact propagation and indicators characterizing the danger of exposure, depending on the type of impact. A general algorithm of actions is proposed that is necessary in identifying environmental aspects in the construction of oil and gas enterprises.

Keywords: environmental aspect; significant environmental aspects; environmental protection; oil and gas industry; construction of facilities; production processes.

ECONOMICS AND ORGANIZATION OF CONSTRUCTION

IMPROVING THE QUALITY OF HOUSING AND COMMUNAL SERVICES THROUGH THE FORMATION OF INNOVATION PERSONNEL POLICY IN THE HOUSING AND COMMUNAL ECONOMY

I. E. Goryushinskaya, M. V. Dolzhenkova

Annotation. The main problems associated with the professional training of specialists in the field of housing and communal services are considered. The task was to eliminate the shortage of personnel in the field of housing and utilities and the transition of training to a higher professional level. The data on the lack of specialists in the sphere of housing and public utilities, to date, the proper level of professional education are given, as well as some reasons for reducing this level are indicated and options for raising it to a higher, new level of technical intelligence are considered. After analyzing the presented factors, some reasons for low professional training and possible ways to overcome them, as well as other problems requiring the introduction of innovative approaches to their solution in the light of the requirements for the successful implementation of housing reforms, were identified. In order to achieve the goals of preparing the required number of highly qualified specialists, it is also recommended to consolidate the efforts of all branches of government, as well as commercial structures, public and educational institutions both to attract funds and to develop a unified regulatory and legislative framework. The conclusion was made about the need for innovative approaches to solve problems in the housing and utilities sector with the help of competent personnel to support the reforms being conducted and to train specialists of a new level in the management of the quality of housing and utility services.

Keywords: department of housing and utilities; professional training; innovative personnel policy in the housing and utilities sector.

RISK ASSESSMENT OF AN ACCIDENT AT AN OBJECT «CITY SEWAGE PUMP STATION»

G. D. Shmelev, A. V. Zhukova

Annotation. As part of the work to conduct a comprehensive survey of the technical condition of the building structures and equipment of the building of the city sewage pumping station Levoberezhnaja, Voronezh, the risk assessment of the accident was performed using the requirements of GOST 31937-2011. In assessing the risk of an accident, calculations were performed to place the buried machine room of the main building. Three events were considered as calculated accidents: event 1 - failure of the main equipment; event 2 - destruction of the separating wall between the reservoir and the machine room with the flooding of the latter; Event 3 – flooding of the machine room with melt water when the territory is flooded. For each calculated event, the probabilities of their origin and the cost of the consequences of eliminating accidents and the costs associated with stopping the operation of equipment are estimated. Using the obtained values, an accident risk assessment was carried out for each calculated case and for various combinations thereof. According to the results of the calculation of the accident risks, the customer's representatives were given recommendations for the further operation of the facility.

Keywords: sewage pumping station; technical condition assessment; accident risk; normal operation; overhaul.