

## **ARCHITECTURE AND CONSTRUCTION: CONSTRUCTIONS, BUILDINGS AND FACILITIES**

**Guryanova A.V., Hutova E.Ed.**

### **INTENSITIES RATIO OF CRITICAL MOMENTS IN THE CALCULATION OF BENDING ELEMENTS USING NORMALIZED DIAGRAMS**

The paper presents a comparative analysis of the calculation results of the reinforced concrete cross-section on the specified bending moment in the mirror plane using a non-linear deformation model.

The figures for fitting sand concrete deformation, which were used to construct the diagrams, were taken from the normative documents [4]. Reinforced concrete construction calculations by resistibility are realized in programsets.

*Keywords: reinforced concrete element, diagram technique, concrete, fittings, pressure, deformation, resistibility, design model.*

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### **MATHEMATICAL MODELING OF LONGEVITY THIN-WALLED SPATIAL CONSTRUCTIONS INTERACTING WITH THE AGGRESSIVE ENVIRONMENT**

The article is of an overview nature. BIM technologies imply the creation and management of information at all stages of the life cycle of construction objects. The problem of describing the evolution of the life cycle of load-bearing structures at the design stage and determining their durability has gained relevance. To determine the durability of building structures by calculation, it is necessary to create mathematical models of the interaction of loaded structures with an aggressive environment. Various approaches to the creation of mathematical models that take into account the peculiarities of the interaction of structures with aggressive media are analyzed.

*Key words: information technology, theory of knowledge, durability, mathematical models, aggressive environments, methods for calculating the durability of structures.*

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## **DESIGN AND CALCULATION SOLUTIONS FOR DESIGNING BIOLOGICAL TREATMENT FACILITIES**

The article is devoted to the study of design solutions for the biological treatment facility construction - a pumping station for emptying secondary sedimentation tanks. The initial data for design were considered and analyzed: climatic conditions at the site, hydrogeological conditions, geological conditions, the assessing the impact of construction work on the surrounding buildings was analyzed. The accepted volumetric planning and design solutions are described and substantiated. Recommendations for the building structures and foundations protection from destruction in aggressive gaseous and liquid environments are given. Compliance with the requirements of mechanical safety is justified by calculations performed manually, as well as use of a certified software package LIRA-SAPR; program «Base»; program «Foundation». Technical solutions for the foundations were made on the basis of calculations performed in certified software complexes LIRA SAPR, «Foundation» and «BASE»; the calculations of the enclosing structures were performed manually. Building structures calculations were carried out: lateral pressure, forces in the walls, reinforcement in the walls were determined, calculation of the structure for ascent was performed.

*Key words: pumping station, geological and hydrogeological conditions, design and calculation of building structures.*

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## **ARCHITECTURE AND CONSTRUCTION: BUILDING MATERIALS AND PRODUCTS**

**Abdrakhimov V.Z., Lazareva N.V.**

## **THE USE OF WASTE FLOTATION COAL ENRICHMENT IN THE PRODUCTION OF EXPANDED CLAY CONTRIBUTES TO THE ENVIRONMENT AND EXPANDS THE BOUNDARIES OF LAND MANAGEMENT AND CADASTRE**

Extraction and processing of natural mineral raw materials is associated with the formation of large amounts of various industrial waste, the accumulation of which leads to a deterioration of the environmental situation in the regions, removes land from economic circulation, and pollutes the environment. The main task of cadastres and land management

is to organize the rational use of all categories of land, including agricultural land. Studies have shown that the combined use of montmorillonite clay and waste flotation of coal enrichment contributes to the production of an effective thermal insulation material – expanded clay with high physical and mechanical properties. Waste of coal enrichment contributes to the formation of mullite during the firing of expanded clay.

*Keywords: waste of coal enrichment, montmorillonite clay, expanded clay, ecology, land management, cadastral.*

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### **REGRESSION ANALYSIS OF THE INFLUENCE OF SLAG FROM FERROALLOY SMELTING ON PHYSICAL AND MECHANICAL PROPERTIES INDICATORS OF CERAMIC BRICKS**

The use of ferrous metallurgy waste-slag from the smelting of ferroalloys and waste of the fuel and energy complex-inter-shale clay allows you to get a ceramic brick with high physical and mechanical characteristics without the use of natural traditional materials. Experimental data have shown that the brick has optimal physical and mechanical characteristics at the content of slag in the compositions of ceramic masses 30%. The method of regression analysis based on the results of the dependence of physical and mechanical parameters on the content of the amount of slag showed that the experimental data are well described by mathematical dependencies with the accuracy accepted in practical calculations, the given modules give quite good results.

*Keywords: slag, inter-shale clay, ceramic brick, regression analysis, indicators, mathematical dependence.*

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### **MODELING OF AN INTERPHASE TRANSITION LAYER IN CERAMIC MATRIX COMPOSITES FOR REDUCING STRUCTURAL DEFECTS IN BUILDING MATERIALS**

It has been shown the urgency of expanding the raw material base for the production of building ceramic materials through the use of technogenic and substandard natural silicate raw materials. It was presented the formation of a

transition layer at the interface between the shell (matrix) and the core (aggregated filling material) of a ceramic material with a matrix structure. The concept of manufacturing a multilayer sample simulating the transition at the macro level between the shell and the core of the ceramic matrix composite is presented. It is presented the ratio of the raw materials of the core and shell for the preparation of various layers of the model sample using technogenic and natural raw materials. It has been noted the dependence of the properties of composite materials on the thermodynamic, kinetic and mechanical compatibility of components during interaction at the interface.

*Keywords: ceramic matrix composite, interfacial transition layer, multilayer ceramic sample.*

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## **ECONOMICS, ORGANIZATION AND MANAGEMENT OF ORGANIZATIONS, BRANCHES, COMPLEXES**

**Anpilov S.M., Sorochaikin A.N.**

### **PERFORMANCE MANAGEMENT OF STATE UNIVERSITIES IN SAMARA REGION BASED ON THE SCIENTOMETRIC ANALYSIS**

The article carries out the analysis of scientometric indicators behavior from 2009 up to now of Samara region higher education institutes.

The main research method was a bibliometric analysis. This method was applied to calculate the scientometric of these educational institutions in the RSCI database on date 3-6 November 2020.

The authors point out positive and negative developments in the behavior of quantitative and qualitative patterns of Samara region state universities scientometrics and scientific journals published by them.

*Keywords: RSCI, scientometrics, bibliometric analysis, higher education institute, Samara region, indexing, Hirsch index, impact factor, SCIENCE INDEX.*

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## **THE PROBLEM OF MIDDLE-GRADE MEDICAL STAFFING IN BUDGETARY HEALTH ORGANIZATIONS (THE CASE OF SAMARA REGION)**

The article considers the shortage problem of health-care professionals with secondary medical education in health institutions. Determined the ways of action to resolve the issue of providing middle-level medical personnel in the budget health-care organizations in towns and rural settlements of Samara region.

*Keywords: health-care, health staffing problems, middle-grade medical staff, prestige of the profession.*

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## **SOME ASPECTS OF SECURITIES TAXATION**

The authors considered the types of taxation and tax incentives for income from operations with basic securities - stocks and bonds circulating in the Russian and American financial markets. Comparison of interest rates, types of income from securities: coupons, dividends and a positive result from the purchase and sale of securities - speculative income. Special attention is paid to the possibilities of reducing the tax burden on income received from operations with securities.

*Key words: securities, taxation, shares, bonds, investments*

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## **MANAGEMENT OF SOCIO-ECONOMIC DEVELOPMENT OF SOCIETY**

**Anpilov S.M., Abdrakhimov V.Z.**

## **RELATIONSHIP BETWEEN ECOLOGY AND ENVIRONMENTAL MANAGEMENT IN THE SAMARA REGION**

Modern research and analysis of environmental problems that have developed in the Samara region are considered, which have shown that environmental pollution not only remains at a high level, but also does not improve. Modern research and analysis of environmental problems that have developed in the Samara region has shown that environmental pollution not only remains at a high level, but also does not improve. Researchers and scientists of the Samara region in their research have shown that the main sources of pollution are: first of all, these are enterprises of the petrochemical, energy, and machine-building industries that emit wastewater directly into the rivers flowing in this territory. This uncontrolled negative discharge of wastewater from Samara industrial enterprises has a negative impact on the quality of water resources in the Samara region. Regular studies of water samples by Samara researchers have confirmed that a large number of samples are in the composition

*Key words: ecological management, environment, ecological problems, international standard.*

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