Министерство науки и высшего образования Российской Федерации

Федеральное государственное бюджетное образовательное учреждение
высшего образования
«Сибирский государственный индустриальный университет»

Архитектурно-строительный институт

АКТУАЛЬНЫЕ ВОПРОСЫ СОВРЕМЕННОГО СТРОИТЕЛЬСТВА ПРОМЫШЛЕННЫХ РЕГИОНОВ РОССИИ

ТРУДЫ II ВСЕРОССИЙСКОЙ
НАУЧНО-ПРАКТИЧЕСКОЙ КОНФЕРЕНЦИИ
С МЕЖДУНАРОДНЫМ УЧАСТИЕМ

8–10 октября 2019 г.

Новокузнецк
2019 г.

УДК 69+624/628+66/67+72
А 437

А 437 Актуальные вопросы современного строительства промышленных регионов России : труды научно-практической конференции / М-во науки и высш. образования Российской Федерации, Сиб. гос. индустр. ун-т, Архитектурно-строительный институт ; под общей редакцией А.Ю. Столбоушкина, Е.А. Алешиной, О.В. Матехиной, Е.А. Благиных,– Новокузнецк, Изд. Центр СибГИУ, 2019. – 352 с.

ISBN 978-5-7806-0530-0

Представлены материалы докладов II Всероссийской научно-практической конференции с международным участием «Актуальные вопросы современного строительства промышленных регионов России», состоявшейся в Сибирском государственном индустриальном университете 8–10 октября 2019 г. Доклады отражают результаты работ по трем основным направлениям конференции: «Архитектура и градостроительство промышленных регионов России»; «Новые материалы, конструкции и инновационные технологии в строительстве»; «Новые концептуальные подходы в проектировании и реконструкции инженерных систем жизнеобеспечения».

Издание предназначено для научных и инженерно-технических работников в области архитектуры и строительства, а также для студентов, магистрантов, аспирантов и молодых ученых.

УДК 69+624/628+66/67+72

ISBN 978-5-7806-0530-0

ПРЕДИСЛОВИЕ

Сборник трудов опубликован по результатам II Всероссийской научно-практической конференции с международным участием «Актуальные вопросы современного строительства промышленных регионов России», которая состоялась в Сибирском государственном индустриальном университете 8 – 10 октября 2019 г.

Организатором конференции в первую очередь является кафедра инженерных конструкций, строительных технологий и материалов Архитектурно-строительного института СибГИУ при поддержке и содействии администрации университета. Конференция проводилась в рамках юбилейных мероприятий, посвященных предстоящим 90-летию Сибирского государственного индустриального университета и 60-летию Архитектурно-строительного института.

Работа Всероссийской научно-практической конференции «Строительство-2019» включала следующие основные направления:

- архитектура и градостроительство промышленных регионов России;
- новые материалы, конструкции и инновационные технологии в строительстве;
- новые концептуальные подходы в проектировании и реконструкции инженерных систем жизнеобеспечения.

В конференции приняли участие свыше 150 ученых и специалистов из различных образовательных и производственных предприятий Российской Федерации, Казахстана, Кыргызстана и Монголии, в их числе:

– Алтайский государственный технический университет им. И.И. Ползунова, г. Барнаул, Россия

– Белгородский государственный технологический университет им. В.Г. Шухова, г. Белгород, Россия;

– Военный учебно-научный центр Военно-воздушных сил «Военно-воздушная академия им. профессора Н.Е. Жуковского и Ю.А. Гагарина» Министерства обороны РФ, г. Воронеж, Россия

– Дарханский филиал Монгольского технологического университета, г. Дархан, Монголия

– Донской государственный технический университет, г. Ростов-на-Дону, Россия;

– Институт машиноведения им. А.А. Благонравова Российской академии наук, г. Москва, Россия

– Казанский государственный архитектурно-строительный университет», г. Казань, Россия

– Кубанский государственный аграрный университет имени И. Т. Трубилина, г. Краснодар, Россия

– Кузбасский государственный технический университет им. Т.Ф. Горбачева, г. Кемерово, Россия;

– Кыргызский Государственный Университет Строительства, Транспорта и Архитектуры им. Н. Исанова, г. Бишкек, Кыргызстан

– Национальный исследовательский Мордовский государственный университет им. Н.П. Огарёва», г. Саранск, Россия

– Национальный исследовательский Томский политехнический университет, г. Томск, Россия

– Новосибирский государственный аграрный университет, г. Новосибирск, Россия;

– Новосибирский государственный архитектурно-строительный университет, г. Новосибирск, Россия;
– ООО «Баскей Керамик» г. Челябинск, Россия;
– ООО «Сибирская Проектно-Строительная Компания», г. Новокузнецк, Россия
– ООО «Спецмонолитстрой», г. Ростов-на-Дону, Россия
– ООО «Углестринпроект», г. Новокузнецк, Россия
– Оренбургский государственный университет, г. Оренбург, Россия
– Павлодарский государственный университет им. С. Торайгырова, г. Павлодар, Республика Казахстан;
– Саратовский государственный технический университет им. Гагарина Ю.А., г. Саратов, Россия;
– Сибирский государственный индустриальный университет, г. Новокузнецк, Россия;
– Сибирский государственный университет путей сообщения, г. Новосибирск, Россия;
– Сибирский федеральный университет, г. Красноярск, Россия
– Томский государственный архитектурно-строительный университет, г. Томск, Россия;
– Тувинский государственный университет, г. Кызыл, Россия
– Тюменский государственный университет, г. Тюмень, Россия
– Южный Федеральный университет», г. Ростов-на-Дону, Россия и др.

Также в работе конференции приняли участие ученые и специалисты из Брянска, Тюмени, Красноярска, Кемерово, Барнаула, Кызыла, Челябинска, Оренбурга, Ростова-на-Дону, Краснодара, Казани, Воронежа, Брянска и др.

Оргкомитет выражает благодарность всем участникам конференции и приглашает всех желающих принять участие в последующих конференциях, посвященных вопросам современного строительства промышленных регионов.

Оргкомитет конференции

Рабочие моменты конференции

УДК 624.01:004.942:624.07:69.07

ВОПРОСЫ ПРОЕКТИРОВАНИЯ ЗДАНИЙ И СООРУЖЕНИЙ С ИСПОЛЬЗОВАНИЕМ РАСЧЕТНЫХ ПРОГРАММНЫХ КОМПЛЕКСОВ

Матвеев А.А.

ФГБОУ ВО «Сибирский государственный индустриальный университет» (СибГИУ), г. Новокузнецк, Россия

Аннотация. В статье рассмотрены общие задачи проектирования зданий и сооружений, требования, предъявляемые к инженерам-конструкторам и актуальность применения расчетных программных комплексов. Обозначены проблемы учета действующих нагрузок и воздействий на проектируемые здания и сооружения, выбора конструктивных решений проектируемых зданий и сооружений. Приведен пример проектирования промышленного здания и принципы его расчета.

Ключевые слова: инженер-строитель, задачи проектирования, здание, сооружение, расчетные программные комплексы.

В настоящие время строительство по-прежнему базируется на двух основных принципах проектирования:

1. С одной стороны здание или сооружение необходимо запроектировать достаточно устойчивым к внешним нагрузкам и влияниям внешней среды, и внутренним нагрузкам и условиям производственной среды и технологического процесса;

2. С другой стороны достаточно экономичным с точки зрения расхода материалов, трудозатрат и эксплуатации.

Данные вопросы напрямую касаются инженера-строителя, проектирующего здание или сооружение. В его компетенции решать вопросы о том, как будет запроектировано здание или сооружение, какие материалы, изделия и конструкции будут применены и какая будет использоваться технология строительства будущего здания или сооружения.

Одной из проблем, встающей перед проектировщиком, становится выбор конструктивной схемы и правильный сбор внешних нагрузок, действующий на нее. Тут на помощь инженеру-строителю приходит свод правил СП «Нагрузки и воздействия», а также другая нормативная и техническая документация об особенностях проектирования и сбора нагрузок по типу проектируемого здания или сооружения.

Например, требуется запроектировать каркас здания, который мог бы обеспечить беспрепятственный производственный процесс и выдержать наиболее невыгодные сочетания таких нагрузок как: нагрузка от собственного веса элементов каркаса и других элементов, нагрузка от мостового крана в вертикальном и горизонтальном направлении, снеговая и ветровая нагрузки, нагрузки от веса промышленной пыли, сейсмического воздействия и другие нагрузки. И при этом для каждого элемента каркаса это сочетание нагрузок может быть разным и сильно отличаться по составу. Более того, нужно учитывать вероятность одновременного воздействия различных нагрузок во времени и принимать во внимание этот фактор. И как следствие, каркас здания был выбран металлическим, на отдельно-стоящих фундаментах с опоясыванием по контуру монолитным железобетонным цоколем. Жесткость такого каркаса обеспечивается: в поперечном сечении жестким примыканием колонн к фундаменту и

шарнирным соединением колонны и стропильной фермы покрытия; в продольном направлении жесткость каркаса обеспечивается наличием связевых блоков в торцах и в середине здания. Основой проектирования является расчет металлического каркаса здания с использованием расчетных программных комплексов. В проекте применены современные конструктивные решения облицовки здания трехслойными стеновыми панелями и вентилируемого фасада, использованы современные защитные покрытия для металла и бетона.

На данный момент благодаря развитию расчетных программных комплексов появилась возможность оперативно выполнять расчеты конструктивных схем, определять расчетные напряжения в сечениях элементов и, следовательно, определять наиболее выгодную конструктивную схему. В данном случае от инженера-строителя требуются умения грамотного использования программных комплексов со знанием принципов их работы, знание основ и правил проектирования для задания правильных свойств элементов расчетной схемы в программных комплексах, предусмотреть все возможные нагрузки и их сочетания, затем на основании полученных результатов произвести проектирование местных узлов и элементов.

Сегодня работа по проектированию зданий и сооружений переходит на новый уровень обеспеченности исходными данными, результатами расчетов и качеством проектирования, что дает толчок к дальнейшему развитии строительной промышленности, продвигая инженерную мысль дальше в постижении науки, техники и благоустройстве жизни.

Библиографический список

1. Матвеев А.А. Вопросы усиления строительных конструкций. Актуальные вопросы современного строительства промышленных регионов России: труды Всероссийской научно-практической конференции с международным участием. / Сиб. гос. индустр. ун-т; под общей редакцией И.В. Зоря, А.Ю. Столбоушкина, А.А. Оленникова. – Новокузнецк: Изд. центр СибГИУ, 2016. – 339 с. – С. 267 – 270.

2. Матвеев А.А., Максимова Н.И. Усиление строительных конструкций. Наука и молодежь: проблемы, поиски, решения: Труды Всероссийской научной конференции студентов, аспирантов и молодых ученых / Под общей редакцией С.М. Кулакова; СибГИУ – Новокузнецк, 2006.

3. Матвеев А.А. Знания – основа качества и безопасности в строительстве. Новые строительные технологии 2010: сб. науч. тр. / СибГИУ. Новокузнецк, 2010.

SUMMERY

УДК 378.096

SIBGIU INSTITUTE OF ARCHITECTURE AND CONSTRUCTION: PRESERVING TRADITIONS, BUILDING THE FUTURE

Aleshina E. A.

The article presents the main stages of creating and directions of development of the Architectural and construction Institute of the Siberian State Industrial University (ACI SibSIU). Photo materials of the Department of architecture of ACI SibSIU were used.

Key words: Architecture and construction Institute, Siberian State Industrial University.

Section 1.
ARCHITECTURE AND URBAN PLANNING OF RUSSIA INDUSTRIAL REGIONS

УДК 72.03 (571.17)

ARCHITECTURAL AND URBAN HERITAGE OF THE LAND OF KUZNETSK

Blaginykh E.A., Terednickenko Z.M.

The evolutionary development of the architectural and urban planning culture of the land of Kuznetskaya has been shown for six historical periods, characteristic features and principles of formation of the architectural and artistic environment of the city of Kuznetskaya have been revealed.

Keywords: Spatial structure, architectural and urban planning heritage, Kuznetsk city.

УДК 711.417.2 (571.17)

SOCIALIST CITY. BEGINNING

Zhuravkov M. Yu., Blaginykh E.A.

Designing cities in Siberia in the 1930s is a rather complex process, due to the General economic situation, the settlement system and the development of settlements. One of the most significant factors in the development of cities was the emergence of powerful city-forming impulses based on the plan of industrialization, economic and cultural development of Siberia, and, as a consequence, the concentration of population in these areas. . The factors and reasons for the emergence of such a phenomenon as a socialist city on the example of Novokuznetsk are presented, its Genesis and formation until the mid-twentieth century are presented.

Keywords: socialist city, garden city, General plan, New Kuznetsk.

УДК 727.3.03 (571.17)

HISTORY OF THE CREATION OF A COMPLEX OF EDUCATIONAL BUILDINGS SIBSIU IN NOVOKUZNETSK

Magel V.I.

The article contains the materials of the study of the history of the creation, placement and architecture of the complex of educational buildings of the Siberian State Industrial University (SibSIU)).

Keywords: Complex of educational buildings, SIBM, media, SibSIU.

УДК 332.1

OPTIMIZATION OF THE TERRITORIAL STRUCTURE OF THE CITY OF PROKOPIEVSK TAKING INTO ACCOUNT THE PROGRAM «TERRITORY OF ADVANCED SOCIAL AND ECONOMIC DEVELOPMENT»

Naryzhnaya V.V., Grigoryeva T.I.

The article discusses ways to optimize the land resources of urban municipal territory taking into account the program «Territory of advanced social and economic development». The purpose of the article is to choose the most suitable land for the placement of an industrial enterprise which will create favorable conditions for social and labor adaptation of young people as well as improve the socia-economic efficiency of the municipality.

Key words: territorial optimization; social and economic development; problems of single-industry towns.

УДК 72.025:[725:622.271]

ARCHITECTURAL RENOVATION RESTORED COAL SECTION AREAS

Blaginykh E.A., Drozhzhin R.A.

The work contains studies on the development of the concept of architectural renovation of the worked areas of the Berezovsky section as a platform for the implementation of urban projects within the framework of four main blocks: Transport and Communications, Architecture and Environment, Ecology, Culture and Sports.

Key words: Architectural renovation, infrastructure development, greening, sustainable development of territories.

УДК 721.011.12

EFFICIENCY OF THE RECONSTRUCTION OF HOUSING

Matekhina O.V.

The work addresses the issues of obtaining housing that meets modern comfort requirements as a result of the reconstruction of the old Housing. Redevelopment allows to bring the space area in line not only with the existing standards of social housing, but also to get residential and auxiliary rooms of higher comfort.

Keywords: reconstruction, redevelopment, comfortable housing.

УДК 727

EXPERIENCE OF RECONSTRUCTION OF INTERIOR FLOW SIBGIU AUDIENCE - ARCHITECTURAL ACOUSTICS AND STYLE

Ershova D.V.

The problems and the experience of reconstructing the interiors of the flow auditorium, the functional, architectural, artistic and technical tasks of reconstruction related to the formation of an aesthetically high-quality working environment for educational activities are considered. The results of the audience's design from sketches to implementation, the natural room acoustics calculations with recommendations for creating a diffuse sound field are presented.

Keywords: interior reconstruction, interior design, classroom, acoustic calculation, diffuse sound field, reverberation time, secondary reflections, architectural acoustics, architecture.

УДК 721.04.8

THE ORGANIZATION OF THE COGNITIVE AND ADVERTISING COMPLEX IN THE CAMPUS SIBSIU

Nazarenko I.K., Matekhina O.V., Shevchenko V.V.

A conceptual design of a potential possible innovation of one of the components of the SibSIU campus is proposed - an elevated indoor transition from the main building to the metallurgical building, by placing a targeted photo gallery and a commemorative sculpture in honor of the 90th anniversary.

Keywords: stained-glass windows, photo stands, informative, institute, atrium, sculptural composition, in honor of the 90-th anniversary of the university.

УДК 72.025.5:711.611

RENOVATION OF THE EASTERN SQUARE IN THE CAMPUS SIBGIU

Nazarenko I.K., Matekhina O.V., Shevchenko V.V.

A two-part outline design of potential urban-architectural and construction measures for socio-economic and cultural studies to complement the university's campus in connection with the upcoming celebration of its 90th anniversary has been proposed.

Keywords: existing components, reconstruction, renovation, walk of fame.

УДК 728.011.26+725.2 (571.16)

FEATURES OF THE ORGANIZATION MODERN RESIDENTIAL DEVELOPMENT

Varlakova E.S., Blaginykh E.A.

The possibility of reconstruction of existing neighborhoods as the most important positive factor of qualitative urban transformation of Tomsk is considered.

Keywords: multifunctional residential complex, elements of urban environment.

УДК 692.23.699.86

ON THE ISSUE OF IMPROVING THE MOUNTING SYSTEMS OF CURTAIN WALLS

D.E. Abramenkov, L.A. Ksendzova

The heat-shielding properties of facades with a ventilated air gap are affected by the thermal conductivity of the material and the dimensions of the brackets of the fastening system. It is shown that the maximum heat-shielding properties of the facade structure are achieved with the smallest number of brackets and their implementation from steel.

Key words: curtain walls, heat insulation, heat loss, heat protection, heat conduction, bracket.

УДК 728.011:[699.841:624.014]

PROJECT OF A RESIDENTIAL HOUSE WITH METALL CONSTRUCTION IN SEISMIC DISTRICT

Nezavitina.E.I, Panov C.A., PanovaV.F.

The project of a residential high-rise building taking into account the construction in the seismic area. The methods of construction and organization of construction for the designed object are chosen. The characteristic of the area of object placement is described. A study on the relevance of the choice of a metal frame, as well as performed thermal calculation of external walls and selected the most effective design to provide the required thermal protection in the Siberian conditions of the designed object.

Keywords: design, multi-storey buildings, seismicity, construction, metal frame, concrete slabs, wall construction, calculation.

УДК 72.07

GLOBALISM CONCEPT AND PSYCHOLOGICAL BASIS CREATIVITY IN THE PRACTICE OF MODERN ARCHITECTURAL EDUCATION

Ershova D.V.

The problems of globalism and the national identification of architecture in the practice of work on final qualifying works in the direction of teaching "architecture", a bachelor's degree are considered. Factors of a psychological, intellectual nature and their impact on architectural creativity during training. Features of the development of creative skills while working on a graduation project.

Key words: globalism in architecture, national identification in architecture, psychology of creativity, preparation of architectural personnel, final qualification work of an architect, bachelor's degree.

УДК 378.14:[72+69]

REFORMS OF ARCHITECTURAL EDUCATION. PROBLEM AND REALITY

Osipov J.K.

It is shown that any reform in education, especially higher education, is a very painful process. As a result, it leads to a sharp decline in young people's interest in higher education in a wide range of specialties.

Keywords: education, architecture, reform.

УДК 349.6

DESIGN OF EXPERIMENTS TO IMPROVE THE LEGAL COMPONENT OF TRAINING MASTERS IN THE DIRECTION OF «LAND MANAGEMENT AND CADASTRES»

Ivanova L.M., Belkov A.V.

The article examines the issue of improving the legal training of masters in the direction of "land Management and cadastres". In order to assess the need for improvement, a scientific experiment is planned with the participation of undergraduates of KuzSTU in the direction of "land Management and cadastres". The form of the experiment - testing of undergraduates in 5 areas of law.

Keywords: land management, cadastre, master's, Kuzbass state technical University, scientific experiment, zemelinoe law, real estate law, forestry law, mineral resources, cadastral work.

УДК 349.6

THE RESULTS OF THE EXPERIMENT CONDUCTED IN ORDER TO IMPROVING THE LEGAL COMPONENT OF TRAINING MASTERS IN «LAND MANAGEMENT AND CADASTRE»

Ivanova L.M., Belkov A.V.

The article examines the issue of improving the legal training of masters in the direction of "land Management and cadastres". In order to assess the need for improvement, a scientific experiment was conducted with the participation of undergraduates of KuzSTU in the direction of "land Management and cadastres". The form of the experiment - testing of undergraduates in 5 areas of law. The results of the experiment are analyzed.

Keywords: land management, cadastre, master's, Kuzbass state technical University, scientific experiment, zemelinoe law, real estate law, forestry law, mineral resources, cadastral work.

Section 2.
NEW MATERIALS, DESIGNS AND INNOVATIVE TECHNOLOGYS IN CONSTRUCTION

УДК 691.4(571.1/.5)

PROSPECTS FOR THE PRODUCTION OF BUILDING CERAMIC MATRIX COMPOSITES IN KUZBASS

Stolboushkin A.Yu.

In view of the priority decisions of the political leadership of the Russian Federation, it has been shown the necessity of the ecological development of the Kuzbass region, which has hundreds of millions of tons of industrial waste. New drivers of construction and development of Kuzbass are given on the example of ceramic building materials. The expediency of the transition of resource-intensive production of building ceramics to new types of technogenic raw materials is noted. The low efficiency of traditional technological methods for producing bricks using technogenic raw materials is shown. It has been presented the relevance of the production of building ceramic matrix composites based on wastes of Kuzbass. The boundary conditions for creating ceramic matrix composites with structures of various types are given, including a cell-filled, a cellular with a glass-crystal frame, and volume-painted structures. The effectiveness of using the developed compositions and technologies for producing ceramic wall materials of a matrix structure is noted.

Key words: environmental safety, technogenic aluminosilicate raw materials, ceramic matrix composites, cellular ceramics with glass-crystal framework, volume-painted ceramics of matrix structure

УДК 624.148.

PROSPECTS OF PRODUCTION OF GRANULATED FOAM GLASS BASED ON SILICA ROCKS OF THE SOUTHERN URALS

Storozhenko G.I., Gritchin G.S.

The paper presents the results of laboratory studies and pilot tests of the production of foamed glass based on the silica clay from South Urals. It is shown that the granulated foamed glass can be commercially produced from widespread siliceous raw material, using home equipment.

Keywords: siliceous raw material, silica clay, granulated foamed glass

УДК 692:624.0273.

THE POSSIBILITIES OF FITTING SMALL CONCRETE CONCRETE BY ADDITIVES OF DIRECTED ACTION

Pichugin AP, Hritankov V.F., Pichugin M.A., Matus E.P.

The results of increasing the resistance of fine-grained concrete to the effects of water and negative temperatures are given. To this end, the coefficients of the linear temperature expansion of the material were first studied, after which the optimum prescription parameters were determined using wastes of chrysotile cement production (OCCP) and polymer compositions. Such additives allowed the use of fine-grained concretes in the construction of pavement and curb stones. There is good resistance to water and negative temperatures.

УДК 666.942

PROSPECTS OF PRODUCTION OF COMPOSITE PORTLAND CEMENT AT CEMENT PLANTS IN SIBERIA

Kozlova V.K., Kudyakov A.I., Karpova Y.V., Kusturin A.V.

The article deals with the use of dry ash, formed by flaring Kansk-Achinsk brown coal in the production of composite Portland cement cement plants in Siberia. The performed studies have shown that the use of a combined ash carbonate additive allows to obtain a defect-free cement stone with reduced carbonation shrinkage and increased resistance against sulfate and carbon dioxide corrosion.

Key words: Portland cement, composite Portland cement, high calcium ash, active mineral additives, destructive phenomena.

УДК 691.32

USE OF METALLURGICAL WASTE AS RAW MATERIALS FOR PRODUCING CONCRETE OF VARIOUS PURPOSE

Skripnikova N.K., Semenovykh M.A., Grigorevskaya D.K.

The paper presents research on the possibility of using metallurgical waste as aggregates for concrete. Their properties were investigated and optimal compositions of concrete mixtures were established for the production of fine-grained and heavy concrete.

Key words: concrete, metallurgical waste, raw materials, strength.

УДК 691-048.78

ELECTROPHYSICAL METHODS OF OBTAINING INNOVATIVE BUILDING MATERIALS

Volokitin G. G., Alekseev A. A., Glotov S. A.

The article presents research on the implementation of improving the operational reliability of asphalt and cement dispersed systems, using electrophysical methods of electrification of the surface of both filler and mineral binders. Methods for activation of filler and cement in the field of high-voltage corona discharge are presented. Graphs of the charge value of the surface of the mineral binder as a function of the electrical voltage at the electrodes are given. The optimal processing parameters were determined.

Keywords: corona discharge, asphalt concrete, cement concrete, surface charge, filler, and filler.

УДК 691.42

TO THE QUESTION OF THE FROST RESISTANCE TEST ROAD CLINKER BRICK

Kotlyar A.V., Terekhina Yu.V., Kotlyar V.D.

Abstract: The article discusses issues related to tests of road clinker bricks for frost resistance. It is shown that the test method indicated in GOST 32311-2012 «Clinker ceramic brick for paving. Technical conditions» is not entirely objective. The authors justify that for clinker bricks, taking into account frost resistance requirements and product operating conditions, the methods indicated in GOST 10060-2012 «Concretes. Methods for determination of frost resistance» for road concrete.

Keywords: clinker brick, frost resistance, tests, product brand, freezing, thawing.

УДК 691.022 : 72.04

NEW TYPES AND TECHNOLOGIES OF FINISHING CONSTRUCTION STRUCTURES

Panov S.A., Karpacheva A.A., Panova V.F.

The results of a laboratory experiment showing the production of translucent concrete using light-transmitting fiber and aggregate - burned rock are shown. Technologies for producing wall structures using cassette and 3D technology have been developed. The experience of using 3D technology in construction, the costs of manufacturing objects are considered. Laboratory models made. The signs of the use of light-conducting fiber for wall construction and small architectural forms are given. Recommended mixtures for concrete using local raw materials and industrial waste.

Key words: experiment, aggregate, wall structure, model, light-conducting fiber, cassette technology, 3D technology.

УДК 691.33, 624.131.38.

INFLUENCE OF NANO-DIMENSIONAL ADDITIVES ON PROPERTIES REINFORCED-REINFORCED SOILS

Pichugin A.P., Yazikov I.K., Chesnokov R.A., Bobylskay V.A.

Effective and cheap methods of strengthening soils with Portland cement with directional additives are considered. Inadequate water resistance and durability of ground-concrete on stretching during bending were noted. An integrated approach is proposed in the creation of reinforced-reinforced soils. The interaction processes in the systems "soil – Portland cement – ZHSH – OHCHP" in conjunction with the processed nanoscale compounds of the armature, which showed the effectiveness of the proposed technical solutions.

УДК691.327.33.2 (043.3)

STUDY OF THE CONDUCTIVITY OF NON-AUTOCLAVING AERATED CONCRETE FROM NATURAL AND TECHNOGENIC RAW MATERIALS OF KYRGYZSTAN

Kasymova M.T., Dyikanbaeva N.A. Oruzbaeva G.T.

The results of studies of the thermal conductivity of non-autoclaved aerated concrete based on natural and technogenic raw materials of Kyrgyzstan are presented. The influence of the structure of concrete and the coefficient of thermal conductivity of the raw materials used on the thermal conductivity of aerated concrete is established.

Keywords: non-autoclaved aerated concrete, thermal conductivity coefficient, filler, ash, limestone-shell rock, density, microstructure.

УДК 666.646

CEMENT SYSTEMS USING WASTES OF THE METALLURGICAL INDUSTRY OF THE REPUBLIC OF KAZAKHSTAN

Stanevich V.T., Nurkina M.N., Kudryshova B.Ch., Vyshar O.V.

The article is devoted to the use of blast furnace slags of ArcelorMittalTemirtau JSC in the cement industry. The paper considers the formation of cement-slag systems and investigated their quality indicators.

Key words: metallurgical slag, cement systems, clinker.

УДК 691.54

APPLICATION OF ASH-SLACK WASTE OF CHP OF MONGOLIA IN THE CREATION OF THE ROADS

Hadbaatar A., Mashkin N.A., Molchanov V.S.

The results of the study of the Ash-slag waste of the Erdenet and Darhan CHP of Mongolia as components of the ground-solo betonetons for strengthening the upper layers of the earthen of roads, the devices of the bases of road clothes and Shoulders. The topicality of the topic is connected with the growing need for road construction in local materials, while the disposal of ash waste.

Keywords: CHP of Mongolia, ash waste, chemical composition, astringent properties, road soil-building concretes.

УДК 666.973.6:691.147

PRACTICE THE EXPERIENCE PRODUCTS FROM FIBROFOAMCONCRETE IN ROSTOV-ON-DON

Morgun L.V., Morgun V.N., Bogatina A.Y., Kostylenko K.I.

The relevance of the work is based on the need of society in resource-saving materials. It is shown that 17 years of practical production of heat-insulating and structural-heat-insulating fiber-foam concrete allowed to significantly expand the range of products from autoclave-free gas-filled concrete. The building complex of Rostov-on-don received in addition to building blocks such products as window fillets, Windbloc, bridges civil buildings.

Keywords: fibropen concrete, compressive strength, bending tensile strength, facade insulation

УДК 666.3-184.4

APPROBATION OF THE RESEARCHING METHOD OF THE TRANSITION LAYER OF THE NUCLEAR–SHELL OF CERAMIC MATRIX COMPOSITES USING EXAMPLE OF CARBON WASTE

Fomina O.A., Stolboushkin A.Yu.

The results of testing a method for differentially studying the phase composition and the physicomechanical properties of the boundary transition between a dispersion medium and a dispersed phase of ceramic matrix composites are presented on the example of waste from the processing coally argillites and clay raw materials.

Key words: technogenic raw materials, coal waste, ceramic matrix composite, matrix, aggrigated filler material

УДК 692:624.0273.

CORROSIVE RESISTANCE OF PROTECTIVE-DECORATIVE COMPOSITIONS WITH NANODABABILES

Pichugin A.P., Shatalov A.A., Smirnova O.E.

The chemical resistance of protective and decorative coatings of concrete and various stone materials is one of the necessary conditions for assessing the suitability of the material for anticorrosive coatings under the influence of

severe climatic influences and aggressive environments of agricultural production facilities. Positive principles of the formation of polymer-silicate protective compositions are shown in the article and the possibilities of improving their properties are determined.

УДК 54-148: 666.3.016

HIGH TEMPERATURE PHASE TRANSFORMATIONS IN SOLOGIANNI CHARGE, A MODIFIED FILTRATE OF SLUDGE WATER TREATMENT

Shakhov S.A., Nikolaev N.Y.

Features of formation of phase composition of ceramics sologianni modified contained in the filtrate precipitate water treatment by a Sol silicate composition, the possible mechanisms of the formation of anortite - crystalline phase, for increasing strength of ceramic shard of pottery.

Key words: loam, ash, phase transformations, ceramics, anorthite.

УДК 662.73.

LONG-TERM ORGANOMINERAL COMPOSITES WITH DIRECTED ACTION ADDS

Pichugin A.P., Smirnova O.E.

The article describes the properties of compositions based on flax bonfire and complex binder. The data of experiments on determining the effect of moisture on the compressive strength, the resistance of the stromal samples to alternate moistening and drying are presented.

Keywords: bonfire flax, heat insulation, properties, material.

УДК 691.4:666.3

THE INFLUENCE OF DISPERSITY OF MILLED OVERBOARDS OF CARBON MINING ON THE STRUCTURE OF CERAMIC WALL MATERIALS

Kara-sal B.K., Chydyk S.A., Irgit B.B.

The effect of the dispersion of crushed mudstone overburden of coal mining on the structure of ceramic wall materials is established. It was revealed that the regulation of the dispersion of crushed overburden containing compacted clay minerals makes it possible to obtain ceramic wall materials of a porous and dense structure.

Key words: dispersion, overburden, mass, ceramic material, firing, structure.

УДК 622.6

SYNTHESIS OF WEAR-RESISTANT CERAMIC MATERIAL BASED ON THE SYSTEM Al_2O_3–ZrO_2(3 мол.% Y_2O_3) WITH THE USE OF STRONTIUM ZIRCONATE PRECURSOR

Pletnev P.M., Semantsova E.S.

The results for wear-resistant ceramic composite material based on ceramic matrix Al_2O_3 – ZrO_2 (3 mol.% Y_2O_3) strengthened by the formation of uniformly distributed plate hexagonal compounds $SrAl_{12}O_{19}$ (platelet structures). The formation of planetary structures $SrAl_{12}O_{19}$ is provided by the introduction of the precursor strontium zirconate before sintering the ceramic composite.

Key words: ZTA ceramics, aluminum oxide, zirconium dioxide, strontium aluminate, strontium zirconate, platelet.

УДК 666.7-1

COMPARISON OF THE BASIC CHARACTERISTICS OF CELLULAR CERAMIC SAMPLES OF PLASTIC AND SEMI-DRY PRESS

Shevchenko V.V.

The results of laboratory studies of the physicomechanical properties and structure of cellular ceramics obtained by plastic molding and semi-dry pressing are presented. The obtained characteristics of cellular ceramics are compared by various preparation methods, the most suitable method for the production of ceramic cellular bricks is determined.

Key words: plastic molding, semi-dry pressing, cellular ceramics, granulated foam glass, heat-efficient ceramic materials.

УДК 666.974.4:[658.576.1:669.1]

METHOD OF CALCULATING THE COMPOSITION OF A MULTI-FRACTION MIXTURE USING METALLURGICAL WASTE

Panova V. F., Spiridonova I. V., Panov S. A.

Annotation the method of calculation of a three-component mixture with the use of metallurgical waste: crushed and granulated blast furnace slag, waste molding mixture of foundry production, waste of hardware production is Considered. The calculation is given as an example, which allows you to clearly understand the calculation methodology and analyze the data. The solidified mix allows to receive the maximum density of packing of fillers that provides high durability and wear resistance of concrete. The use of secondary mineral resources (BMP) provides environmental efficiency.

Keywords: mixture, waste, blast furnace slag, aggregates, environmental friendliness, calculation, composition.

УДК 666. 3. 022 : 539.2

EFFICIENCY OF USE OF TECHNOGENIC AMORPHOUS SILICON DIOXIDE AS THE ACTIVATOR OF AGGLOMERATION OF POLYMINERAL CLAY RAW MATERIALS

Zhenzhurist I.A., Musin I.R.

Efficiency of use as the activator of agglomeration of clay raw materials of amorphous silicon dioxide on the example of technogenic waste is shown: microsilicon dioxide, kremnegelya and natural diatomaceous earth. Addition to clay and silicic composition of a salt mineralizer, first of all NaCl, increases caking of composition and durability of material. Raised prochnosrt material it is received at compression formation and pressure of pressing of 25-35 MPas

Keywords: clays, microsilicon dioxide, kremnegel, diatomaceous earth, salt mineralizer, agglomeration

УДК 691.41

FORMATION OF ANORTITO-VOLLASTONITE STRUCTURE OF CERAMICS WITH THE USE OF TECHNOGENIC RAW MATERIALS AND REFRACTORY CLAYS

Buruchenko A.E., Kharuk G.N., Nepomniashchikh S.I., Sergeev A.A.

The effect of technogenic raw materials containing calcium carbonate on the formation of anorthite-wollastonite structure of ceramics obtained on the basis of refining waste and refractory clay is shown. Using the method of measuring the electrical conductivity of samples and x-ray phase analysis, physical and chemical processes occurring during firing, which provide high strength products, are determined.

Key words: technogenic raw materials, compositions, roasting, ceramic materials, sintering, properties.

УДК 691-4

GROUND-CONCRETE COMPOSITE MATERIALS BASED ON SILICON-CLAY RAW MATERIALS AND ORGANIC-MINERAL CONNECTORS

Ivaschenko Yu.G., Mameshov R.T.

This paper discusses the theoretical and technological aspects of the structure formation of building composite materials based on the Volga region siliceous-clay raw materials and organic-mineral binders. The research results showed a change in the indicators of adsorption and the cation exchange capacity of silicon-clay raw materials when modified with water-soluble resins. The work carried out on the study of structure formation and the nature of the influence of additives on this process creates the prerequisites for the development of effective compositions of unburned wall building materials.

Keywords: geopolymer, soil concrete, structure formation, acetone formaldehyde resin

УДК 691.3

NEW GENERATION DECORATIVE TILES

Kostin V. V., Rakov M. A., Klimova E.A.

Annotation. In Russia every year there are a number of tiles by a vibrocompression method. However, often these tiles do not meet the aesthetic requirements for their surface.

Keywords: decorative tiles, light-conducting concrete, physical and mechanical characteristics, manufacturing technologies

УДК 666.965.4

THE INTRODUCTION OF COMBINED ASH ADDITIVES IS AN EFFECTIVE WAY TO IMPROVE THE QUALITY OF SILICATE BRICKS

Kozlova V.K., Sarkisov Y.S., Bozhok E.V., Manokha A.M., Logvinenko V.V.

The article deals with the issues of improving the quality of silicate brick by introducing complex additives containing ash into the composition of the raw mixture. Studies show that the introduction of additives can increase the molding strength and compressive strength of the resulting brick. It is shown that the silicate brick made of silicate mass with additives is characterized by high resistance against carbon dioxide corrosion and significantly lower value of carbonation shrinkage.

Key words: silicate brick, complex additive, ash, carbon dioxide corrosion, carbonation shrinkage

УДК 691.5:666.9

COMPOSITE MAGNESIUM BINDERS AND FINISHING MATERIALS FROM NATURAL MAGNESIUM SILICATES

Lytkina E.V.

The paper presents studies to increase the water resistance of a magnesian binder and materials based on them. Trial samples of finishing materials with enhanced physical and mechanical characteristics were obtained.

Key words: magnesia binders, natural silicate fillers, waterproof binders, finishing materials, trioxohydrochloride.

УДК 691.544

KINETICS OF THE EARLY STAGES OF CEMENT SYSTEMS HARDENING WITH INDIVIDUAL AND COMPLEX ADDITIVES BASED ON THERMALLY ACTIVATED POLYMINERAL CLAYS, CARBONATE ROCKS AND POLYCARBOXYLATE SUPERPLASTICIZER

Nizina T.A., Balykov A.S., Volodin V.V., Korovkin D.I., Karabanov M.O.

Study was conducted on the effect of additives based on thermally activated polymineral clays, carbonate rocks, their thermally activated mixtures and polycarboxylate superplasticizer on the kinetics of the early stages of cement systems hardening. Optimum complexes of modifiers that allow directionally regulate the setting time and the rate of increase of the plastic strength of cement paste are revealed.

Key words: cement system, thermally activated polymineral clay, carbonate rock, polycarboxylate superplasticizer, hardening kinetics.

УДК 691.3:666.97:620.1

INFLUENCE OF THE MICRO-DISPERSION MINERAL SILICON ADDITIVE ON THE STRENGTH CHARACTERISTICS OF THE DRY MIXTURE ON THE CEMENT BASIS FOR 3D PRINTING

Ilyina L.V., Semenova M.M.

The report examined the effect of a complex additive of silica fume and hyperplasticizer on the properties of fine-grained concrete mix and the strength of concrete. The optimal amount of complex additives was selected. The highest strength was achieved with the introduction of 5% MK at the initial stages of hardening and 20% MK at the later stages of hardening, together with 0.8% of hyperplasticizer. The speed of curing increases. The use of silica fume additive contributes to the production of quick-hardening high-strength concrete.

Key words: concrete, strength improvement, silica fume, fine-grained concrete, mineral additive, quick-hardening mixture

УДК 691.544

INFLUENCE OF SUPERPLASTICIFICATORS ON THE KINETICS OF HARDENING OF WHITE PORLANCEMENT

Baranov E.V., Shelkovnikova T.I., Baranova E.N.

For use in building materials, white Portland cement is usually used. Distinctive features of white Portland cement are a high alumina module, virtually no calcium aluminoferrites, higher fineness, etc. In this regard, the work presents the results of studies of the influence of various types of superplasticizers on the physicomechanical properties and kinetics of hardening of white Portland cement and determines the optimal dosages of various superplasticizers.

Key words: white Portland cement, plasticizing additives, cement paste, cement stone, water reducing effect, hardening kinetics.

УДК 691.421.24

VARIABILITY OF GRANULOMETRIC COMPOSITION OF CLAY ROCK OF KAMENSKY DEPOSIT

Tacki L.N., Ilyina L.V., Kharitonova M.A., Filin N.S.

Abstract. The shortage of high-quality clay raw materials presents the need to assess the breeds used by brick factories to produce products that meet modern requirements. In connection with the deterioration in the quality of raw materials, it is of interest to determine the variability of its particle size distribution by the content of clay and sand fractions. This gives reason to determine the possible boundaries of variability of the particle size distribution of clay rocks.

Key words: clay raw materials, quality deterioration, particle size distribution, variability assessment.

УДК 691.32

CONCRETE WITH CARBONATE MICROFILLER

Zolotukhina N.V., Lukittsova N. P., Borovik E.G.

The results of studies of the influence of the carbonate microfiller of the deposit “Grigoriopol Mine” of the Republic of Moldova on the average density, strength and frost resistance of concrete are presented. Using the three-factor design of the experiment, the dependences of the properties of concrete on the content of cement, carbonate microfiller and additive MasterGlenium 116 were established, which allows us to predict their values when varying the composition of the concrete mixture.

The possibility of obtaining fine-grained concrete with a strength of 44.7 MPa, water absorption of 1.3% and frost resistance F200 with a carbonate microfiller content of up to 5% was confirmed.

Keywords: concrete, carbonate microfiller, experiment planning, plasticizing additive, strength

УДК 691.327.333

NON-AUTOCLAVED GAS CONCRETE WITH LOW THERMAL CONDUCTIVITY

Ignatova O.A., Ekimenko M.A.

The possibility of obtaining non-autoclaved gas concrete with the addition of aluminosilicate microspheres and the ash of a thermal power plant is substantiated. Technological methods for the production of gas concrete with improved properties have been developed. The use of aluminosilicate microspheres as a structuring additive allows to increase strength, improve thermophysical characteristics. The economic indicators of the resulting composition are calculated.

Key words: gas concrete, aluminosilicate microspheres, ash of thermal power plants, reduction of thermal conductivity

УДК 691.4 : 666.3/.7

THE INFLUENCE OF MINERAL ADDITIVES ON THE COMPOSITION AND PROPERTIES CLAY KAMENSKY FIELD

Mametiev P.A., Shoeva T.E.

The results of experimental studies to determine the effect of the number of supplements albitophyre on the physico-mechanical properties and composition of the ceramic crock. It was found that the change in physical and mechanical depends on the increase in the phase of the anorthite.

Keywords: albitophyre, ultimate compressive, water absorption, average density, anortite

УДК 666.972

INFLUENCE OF CHLODIDES ADDITION ON CEMENT STRENGTH WITH DIFFERENT CONTENT OF ALUMINATES

Ovcharenko G. I., Volobueva A.Yu., Hukalenko M.V.

The strength of stone from ordinary portland cement with a calculated aluminate content of 8.6% with the addition of 0.5–5.0% of calcium, nickel, iron, and aluminum chloride additives increases by 30–40%, while the same strength of cement stone for transport construction with an aluminate content of about 6% is increased by 10-20%. The effect of nickel, trivalent iron and aluminum chlorides additives is higher compared with calcium chloride. The maximum strength gain is shown by aluminum chloride, which provides for the synthesis of more calcium hydrochloride aluminate.

Key words: cement, aluminate content, chloride additives, stone strength.

УДК 666.972

EVALUATION OF THE INFLUENCE OF ADDITIVES ON THE STRENGTH OF PRESSED HYDRATED CEMENT

Ovcharenko G.I., Bobrinok V.A., Maltsev V.V.

The effectiveness of small cement stone additives can be evaluated by determining the contact strength after pressing and subsequent aging. The effect of hydrated cement additives manifests itself in their different effects on the formation of silicon-oxygen radicals in the C-S-H phase. The formation of more polymerized (crosslinked) radicals or their loosening is detected by Raman spectroscopy. A correlation is observed between the strength of hydrated cement compacts with the additive after aging and the presence of more or less cross-linking tetrahedra, which explains the effect of individual small additives.

Keywords: hydrated cement, small additives, contact strength of a stone, silicon-oxygen radicals

УДК 666.972

NON-SHRINKING CONCRETE FROM HIGH WORKABILITY MIXTURES BASED ON HIGH-CALCIUM ASH

Ovcharenko G.I., Lobanova O.V., Sukhenko A.K., Lavrut A.S.

Concrete mixtures with P4 mobility can be converted into non-shrinkable materials using high-calcium ash and gypsum stone additives. Excessive expansion deformations can be smoothed out by adding silica fume.

Key words: non-shrinking concrete, high-calcium ash of thermal power station, gypsum, silica fume.

УДК 666.972.16

COMPARATIVE STUDIES OF THE INFLUENCE OF SIC AND SIO_2 NANO-ADDITIVES ON CEMENT STRENGTH

Ovcharenko G.I., Maltsev V.V.

The strength of a cement stone with the addition of nanoparticles of silicon carbide SiC, as well as colloidal silica in an amount of 0.1-2% increases by 30-35%, while the combined use of each of these additives with a superplasticizer C-3 shows a strength increase of about 40 % However, with the introduction of these additives in an amount of more than 2%, there is a tendency to decrease the strength of cement stone despite the additional formation of C-S-H in the pozzolanic reaction..

Key words: cement, silica sol, carbide, SiC, nano-additives, stone strength.

УДК 691.53:666.96

RESEARCH OF THE INFLUENCE OF ELECTROSEAST MELTING SLAG ON CONCRETE PROPERTIES

Smirnova O.E., Ottochko S.Y.

The possibility of using electric steelmaking slag as a fine aggregate is considered. The main physicochemical properties of slag are determined. One-way analysis of variance was carried out to determine the effect of electric steelmaking slag during the partial replacement of sand on the strength and average density of concrete.

Key words: slag, strength, analysis of variance, concrete

УДК 691.3:[658.567.16669.16]

CEMENTLESS CONSTRUCTION COMPOSITES BASED ON MECHANICALLY ACTIVATED SLAGS OF STEELMAKING

Korneeva E.V.

Creation of composite materials using mechanically activated industrial raw materials relevant today as part of a large-scale task of construction and technological utilization of technogenic formations. The article is devoted to the study of the possibility of using industrial waste from mining and metallurgical enterprises of Kuzbass in the technology for the production of cementless slag concrete matrix matrix composites.

Key words: building composites, mechanically activated slag, matrix structure.

УДК 691.327 : 539. 4

MODIFICATION OF ARTIFICIAL CONGLOMERATES BASED ON CEMENT BY MICRODISPERSED ADDITIVES

Ilina L.V., Vologzhanina S.A

To improve the mechanical properties of the artificial conglomerates based on cement is the use of mineral additives. To ensure high efficiency of action of these additives are not only their properties, but the addition amount and dispersion. We discovered the following. Adding of silica fume in amount of 12 % increases the compressive strength of concrete up to 55 %; 5 % of diopside with 7,24 microns dispersion – up to 40.3 %; 7 % of diopside with 49,7 microns dispersion – up to 46,7 %; use of a complex additive – is 2.5 times higher than the control sample.

Keywords: mineral additives, mechanical strength, silica fume, concrete, diopside.

УДК 691

TECHNOLOGY OF PRODUCTION OF THE FACE BRICKS ON THE BASIS OF OPOKA-LIKE ROCKS ON THE TECHNOLOGY OF SOFT MOLDING

Bozhko Yu. A.

The article presents the main results of scientific research and factory tests of facing bricks made by soft molding technology based on opal-cristobalite rocks. The description of soft brick moulding, its aesthetic characteristics, warrants the design, shapes and sizes. The main factor hindering the development of the scale of production of such bricks is the lack of suitable raw materials. Therefore, an urgent task is to find such raw materials and develop technologies for the production of bricks with improved performance and aesthetic appeal.

Keywords: face brick, opoka-like rocks, soft shaping, crushing, design, surface.

УДК 666.112.2

DISSOLUTION OF SODIUM SILICATE-BULK USING HIGH-VOLTAGE ELECTRIC DISCHARGES

Volokitin G.G., Glotov S.A., Alekseev A.A.

The possibility of producing liquid glass from a sodium silicate block based on the electro-hydraulic Yutkin effect has been investigated. In this case, a number of physical phenomena arise, such as shock, ultrasound, and sound waves, high local temperatures, high-speed fluid flows, and cavitation processes. The combination of these phenomena leads to dispersion of the silicate block and an increase in its reactivity. In comparison with a laboratory stationary autoclave, the energy consumption for producing liquid glass is 80 times less, the time for its production is 56 times less.

Keywords: silicate block, liquid glass, electric discharge, reaction mass, dissolution, reactor, density.

УДК 691

CERAMIC STONES (BLOCKS) FROM TECHNOGENIC RAW MATERIALS OF COAL ROW

Gaishun E. S.

The paper considers the feasibility of using waste of man-made raw coal in the production of ceramic stones(blocks). The feasibility study of the production of products of this type based on coal waste (cake, sludge, screening). The prospects of production of wall products of high efficiency are shown.

Keywords: technogenic raw materials of coal series, ceramic stones, compression molding, strength, density.

УДК 691.21

INFLUENCE OF HEAT TREATMENT ON THE PROPERTIES OF NATURAL STONES

Naumov A.

The results of studies on the effect of heat treatment on the physical and mechanical properties of flat plates of shale mined in the Rostov region are presented. It was found that the firing of the material at a temperature of 400-500 ^{0}C can change the color of the samples from gray to light brown and increase the bending strength.

Keywords: Natural stone, firing temperature, volumetric staining, strength, water absorption, frost resistance.

УДК 620.16

ESTIMATION OF STRENGTH OF CONCRETE STRUCTURES AND BUILDING STONE BY EXPRESS METHOD

Korneyev V.A.

Abstract. The article is devoted to the development of an express method for determining a strength of concrete structures and building stone. The advantages of the proposed method is the ability to take measurements in well conditions. This can be useful in the construction and reconstruction of ventilation and sanitation facilities. The express method has an analytical description that connects the strength and deformation properties of the material with the force of the indenter.

Key words: strength, express method, concrete, building stone, well.

УДК 624

TECHNICAL AND ECONOMIC SUBSTANTIATION WHEN CHOOSING THE FOUNDATION

Platonova S.V.

The introduction of lightweight foundations is a real way to obtain a significant economic effect, reduce the material consumption of foundations. The mass introduction of such structures is possible only after a thorough experimental study of the stress-strain state of the soil base of foundations, development on this basis of reliable methods for predicting the behavior of both foundations and their soil bases. One of the varieties of lightweight foundations, studied both experimentally and using various methods, are slotted foundations.

Key words: foundation, economic effect, experiment.

УДК 694.1

CALCULATED SUBSTANTIATION OF THE RIGID CONSTRUCTION OF A WOODEN COLUMN IN THE FOUNDATION

Zhitushkin V.G., Kazantsev V.E.

Designs of grounding nodes of wooden columns to the foundations of frame buildings require metal consumption, have a busy or pliable. The latter leads to an increase in the flexibility of vertical structures.

It is proposed to perform a rigid jamming of wooden columns in the Foundation, with the conclusions of the formulas to determine the depth of their sealing.

Keywords: column, pinched, Foundation, pressure, compression.

УДК 69.059.32

MODERN METHODS OF REINFORCEMENT OF REINFORCED CONCRETE COLUMNS IN SEISMIC REGIONS

Melnikova K.A., Gurieva V.A.

The main objective of the construction is to maintain the efficiency of residential buildings throughout their entire life cycle. The given problem is difficult as the level of bearing capacity of both separate designs and buildings as a whole, at influence on them of seismic loadings, can change abruptly, without any regularity. The degree of loss of bearing capacity depends on the nature of the damage, as well as physical wear and tear of structures, accumulation of damage, corrosion of fittings, etc.

Key words: reinforced concrete structures, reconstruction, seismic areas, composite materials, polyester sheet, traditional reinforcement of reinforced concrete structures.

УДК 624:378.147

DEVELOPMENT OF A CALCULATION ALGORITHM ECCENTRICALLY COMPRESSED ELEMENT MASONRY

Vasilyeva D. E., Aleshina E.A.

This article presents algorithms for eccentrically compressed elements. In particular, brick pillars of rectangular and T-sections. The need for its development is associated with the introduction of SP 15.13330.2012 [1], and specifically with the updating of SNiP II-22-81 “Stone and stone-stone structures”.

Keywords: actualization, modernization, algorithm, eccentrically compressed element, section.

УДК 62:69

THEORY OF INFORMATION MODELING TECHNOLOGY

Kairkenov H.K., Aleshina E.A., Aminova L.R.

This article discusses the concept of building information modeling technology (BIM), discusses the use of cloud technologies in BIM, as well as the benefits of technology implementation, and several solutions for the implementation of information modeling technology.

Keywords: BIM 360, Cloud technologies, TIM, Revit, BIM technologies, Tekla, ArchiCAD

УДК 624.074.27

DEVELOPMENT OF STRUCTURAL SOLUTIONS OF MONOLITHIC DOMES BASED ON MODELS FOR CALCULATION

Ekimova V.S., Razlivin D.A., Aleshina E.A., Aleshin D.N.

This article presents the justification for the choice of constructive solutions of reinforced concrete ribbed-ring monolithic dome, based on the results of the calculation of the model in the software package Lira-SAPR.

Key words: reinforcement, reinforced concrete dome, ribbed-ring dome, design model, shell.

УДК 624.01:004.942:624.07:69.07

ISSUES OF DESIGNING BUILDINGS AND STRUCTURES USING CALCULATED SOFTWARE COMPLEXES

Matveev A.A.

The article considers the general tasks of designing buildings and structures, the requirements for design engineers and the relevance of the use of settlement software systems. The problems of accounting for the existing loads and impacts on the designed buildings and structures, the choice of design solutions for the designed buildings and structures are indicated. An example of designing an industrial building and the principles of its calculation are given.

Key words: civil engineer, design tasks, building, construction, design software systems.

УДК 69.059.22

IMPERFECTION OF STRUCTURES OR STRUCTURAL SOLUTIONS AS THE CAUSES OF DEFECTS ENCOUNTERED IN THE INSPECTION OF BUILDINGS STRUCTURES

Popravka I. A., Aleshin D. N., Aleshina E. A, Stolboushkin A. Yu.

This article discusses the defects of design solutions, namely the imperfection of nodes and connections of building structures. Imperfection of structures or structural solutions are errors in the design and installation, which lead to the formation of significant local stresses and the formation of cracks or other damage. In this article, an example of such defects are components and design solutions used in lifting structures and complex technical devices such as car dumpers, metal structures which are related to building structures

Keywords: Building structures, design, installation, imperfection, errors, violations, defects, damage

УДК 624:69.05

CHOICE OF CONSTRUCTION STRUCTURES IN DESIGNING BUILDINGS AND CONSTRUCTIONS

Matveev A.A.

The article discusses the design decisions of buildings and structures. The unification and typification during the design allows to reduce the time needed to create objects, reduce the list of structural elements, reduce the cost of products and structures, create the universality of replacing structural elements during construction, repairs and reconstruction of buildings and structures, reduce labor costs in the operation of buildings and structures.

Key words: industrial buildings, architectural and construction unification, industry, documentation, design.

УДК 69.07

EASY METAL STRUCTURES IN ONE-STOREY INDUSTRIAL BUILDING FRAMES

Bobrova E.E., Muzychenko L.N.

This article analyzes the design features of an industrial building with frame supporting structures. The frame structure of the "Orsk" type is considered. A comparison of design options for a single-story single-span industrial building awaiting construction in the Siberian region is given.

Key words: frame construction, industrial building, comparison of options, design features, frame, rack frame.

УДК 624.014:69.059.3

FRAME, COMMUNICATION AND FRAMEWORK SYSTEMS OF MULTISTOREY BUILDINGS

Butsuk I.N., Muzychenko L.N., Baraksanova D.A.

A variety of structural systems of multi-storey buildings is associated primarily with the search for rational schemes of vertical load-bearing structures. Metal supporting structures are used in frame and mixed systems, providing greater freedom of architectural planning and the possibility of its change during operation of the building.

Key words: communications, systems, metal, frame, building, operation, constructive, rigidity.

УДК: 728.011:[699.841:624.012.45]

SELECTION OF EFFECTIVE BUILDING MATERIALS AND TECHNOLOGIES FOR CONSTRUCTION OF A RESIDENTIAL HOUSE

Nagih Y.V.; k.t.n. docent Panov C.A.; docent Panova V.F.

The project of a residential building in earthquake-resistant areas of the city of Kaltan is considered. Performed a marketing study of the housing market. The characteristic of the area where the object is located is described. The results of a patent search for the choice of materials for the foundation and wall structures are given. A thermal engineering calculation was carried out to select effective designs.

Keywords: residential building, patent, concrete, earthquake resistance, foundation, wall construction, raw materials, calculation, composition, properties.

УДК 69.059.32

DOME HOUSES IN MODERN INDIVIDUAL CONSTRUCTION

Muzychenko L.N., Butsuk I.N.

The dome house (or domed housebuilding) is considered a relatively new direction in residential architecture, despite the centuries-old history of domed residential structures. Houses of dome type - it is a rarity, and they are not often found on the streets of cities. For this reason, not much is known about the advantages and disadvantages of such structures and how justified their construction is in comparison with traditional buildings.

Key words: building, dome, connector, frame, insulation, soft roof, racks, load, roof

УДК 69.059.32

THE PROCESS OF OPTIMUM FORMATION OF PLANS FOR THE CONSTRUCTION OF INDUSTRIAL TERRITORIES IN SIBERIA

Zimin A.V., Butsuk I.N., Semin A.P., Muzychenko L.N.

Housing construction is the sphere of materialization of labor, financial and other resources in the creation of life support facilities for people as the main social factor of society's development.

Key words: building, building, problem, optimization, territory, research, complex.

УДК 69.059

ACTUAL PROBLEMS OF INSPECTION AND EVALUATION OF TECHNICAL CONDITION OF BUILDINGS AND STRUCTURES

Popravka I. A., Stakin V. N., Isaev I. P.

This article discusses the current problems in the field of inspection and evaluation of the technical condition of buildings and structures. For the safe operation of buildings and structures should deal with three problems: first, inexperience of engineering and technical personnel; secondly, a lot of competition, tight deadlines and incorrectly assigned tasks to the surveyor; thirdly, bringing buildings or structures in an unacceptable or emergency condition, untimely inspection and repair of defects and damage by the customer

Keywords: Inspection, assessment of technical condition, buildings, structures, problems

Section No. 3
NEW CONCEPTUAL SEMEDIAS IN DESIGN AND RECONSTRUCTION OF THE LIFE SYSTEMS

УДК 697.4

DETERMINATION OF CHARACTERISTICS OF WORK OF THE HEATING POIN BY USING VARIABLE PARAMETERS OF HEAT EXCHANGERS

Rafalskaya T.A.

Abstract. A method for calculating the operating modes of heating points of heat supply systems with a connected heat supply based on the use of variable parameters of heat exchangers is proposed. This method allows the calculation of variable modes of operation of the heat supply system without resorting to the method of successive approximations. The proposed method can be used to predict the temperatures and flow rates of network water, as well as to configure programmable controllers in heating points.

Key words: heat supply system, heat network, heating point, parameters of heat exchangers, heating system, hot water supply system.

УДК 004.384

TECHNICAL DECISION ON REGISTRATION AND PROTECTION OF DATA OF INDIVIDUAL HEATER POINTS OF RESIDENTIAL BUILDINGS

Olennikov A.A., Babich A.V., Smirnova E.V.

The article discusses the technical solution for registration and data protection in modern automated heating centers of residential buildings. A software product developed by scientists of the Tyumen State University is presented, which allows you to register the consumed amount of thermal energy by buildings, keep complete statistics about the operation of sensors, and register emergency situations.

Key words: individual heat point, heat energy metering unit, weather regulation system, GSM modem, statistics server, dispatch system, software product.

УДК 621.643 : 628.147.22

REFINING THE METHOD OF CALCULATING THE INTENSITY OF INTERNAL OXYGEN CORROSION OF PIPELINES OF HEAT NETWORKS

Chapaev D.B., Chapaeva S.G.

The results of studies carried out during the creation of a calculation complex for predicting scheduled repairs of steel pipelines of water heat networks are presented: determination of the approximating dependence of the solubility of magnetite in heating water on its temperature and hydrogen index; clarification of the methodology for calculating the deep index of internal corrosion of the pipeline; assessment of the duration of trouble-free operation of a section of a pipeline that is hermetically isolated from the soil side, taking into account the rate of its internal corrosion (determined by an updated method).

Key words: pipeline corrosion, magnetite solubility, pipeline service life, heat networks, heat supply.

УДК 624.04

CHECKING THE POSSIBILITY OF APPLICATION OF DEGASSING PIPES OF CJSC SPE “ALTIK” IN THE CONDITIONS OF COAL MINES

Chapaeva S.G., Chapaev D.B.

In the framework of R&D, the strength and deformation characteristics of fiberglass degassing pipes manufactured by CJSC SPE “Altik” using oblique longitudinal-transverse winding were checked for their compliance with the requirements in the conditions of operation of mine workings. A technique was developed and a mechanical calculation of a degassing pipeline was performed taking into account the orthotropic operation of fiberglass. Some calculation results are presented.

Key words: degassing pipeline, degassing of mines, mechanical calculation of the pipeline, fiberglass pipes.

УДК 628.16

TECHNOLOGICAL MODELING OF THE WATER TREATMENT PROCESS

Lange L.R.

The report discusses the optimization of existing water treatment facilities at the installation of technological modeling of filtering processes. The installation diagram mounted on existing facilities is shown. Studies of local filtering materials, coagulants and flocculants for the source of water supply of the Tom River are given.

Key words: filtration, technological modeling, optimization, filter loading, reagents.

УДК 628.3

LOCAL FILTERING MATERIALS FOR MINE WATER TREATMENT

Lange L.R.

Research shows the characteristics of the local filter material. Advantages of the burned rocks made in the Kemerovo region are shown. The material has high filtration properties, and can be used in filtration facilities for the treatment of mine and other industrial effluents for subsequent use for technical water supply.

Key words: mine water, industrial effluents, purification, filtration, filter materials, burned rocks, industrial water supply.

УДК 622.864

ANALYSIS OF THE EFFECTIVENESS OF THE WORK OF METAL AND GLASS-PLASTIC PIPELINES

Bashkova M.N., Savenko O.Yu.

The paper analyzes the possibility of using fiberglass and metal pipes used in degassing.

Keywords: fiberglass, pipes, degassing

УДК 697.3

USE HEAT PUMPS FOR HEATING INDIVIDUAL HOMES

Usoltsev I.E., Belozerova I.L., Semin A.P.

This article discusses the feasibility of using heat pumps for heating.

Keywords: heat pumps, types of heat pumps, benefits of heat pumps.

УДК 669.162

ANALYSIS OF THE GAS-MECHANICAL PROCESSES IN THE PRODUCTION OF LIME

Bashkova M.N., Kuzmin A.V.

The paper analyzes the possibility of mathematical modeling of gas mechanics processes in the production of lime.

Key words: lime production, rheological and mechanical characteristics.

УДК 622.6

SYSTEM VENTILATION ON THE BOARD OF INTERNATIONAL COSMIC STATION

Sbrodko P.V., Baklushina I.V.

Information about the ventilation system of the service module "Star" on the ISS. The ventilation system of the residential and the dashboard zone is considered.

Keywords: international space station, service module, residential area, instrument zone.

УДК 622.6

SYSTEM REGENERATION WATER ON THE BOARD OF INTERNATIONAL COSMIC STATION

Serjantov T.A., Baklushina I.V.

Information is provided to provide ISS crew members with drinking and technical water. The water regeneration systems in microgravity conditions are considered. Possible prospects for the development of closed cleaning systems are noted.

Keywords: International Space Station, water regeneration, clean-up, sanitary procedures, drinking water.

АВТОРСКИЙ АЛФАВИТНЫЙ УКАЗАТЕЛЬ

СОДЕРЖАНИЕ

Научное издание

АКТУАЛЬНЫЕ ВОПРОСЫ СОВРЕМЕННОГО СТРОИТЕЛЬСТВА ПРОМЫШЛЕННЫХ РЕГИОНОВ РОССИИ

ТРУДЫ II ВСЕРОССИЙСКОЙ
НАУЧНО-ПРАКТИЧЕСКОЙ КОНФЕРЕНЦИИ
С МЕЖДУНАРОДНЫМ УЧАСТИЕМ

8–10 октября 2019 г.

Под общей редакцией Столбоушкин А.Ю.
Алешина Е.А.
Матехина О.В.
Благиных Е.А.

Техническое редактирование
и компьютерная верстка Матехиной О.В.

Напечатано в авторской редакции в соответствии с представленным оригиналом

Подписано в печать 31.10.2019 г.
Формат бумаги 60 х 84 1/16. Бумага писчая. Печать офсетная.
Усл. печ. л. 20,70 Уч.-изд. л. 22,38 Тираж 300 экз. Заказ 264

Сибирский государственный индустриальный университет
654007 г. Новокузнецк, ул. Кирова, 42
Издательский центр СибГИУ