

## **ASSESSMENT OF THE TIME WHEN PERFORMING THE ENGINEERING AND GEODESIC SURVEYS USING TERRESTRIAL LASER SCANNING AT THE SITES OF THE TCHUISKY HIGHWAY 880-893, 931-942 KM**

**B. F. Azarov**

Altai state technical university of I.I. Polzunov, Barnaul

*At the article the question of quantifying time spent on works by laser scanning at the sites of the Tchuisky Highway 880-893, 931-942 km in total and net time scanning. Describes the features of production works on ground laser scanning when performing engineering and surveying for a complete overhaul of the data sections of the highway R-256 «Chui tract». Shows the quantitative characteristics of the time spent on production work on terrestrial laser scanning these sites.*

**Keywords:** *terrestrial laser scanning, laser scanner GLS-1500 TOPCON, scan time, engineering and geodetic survey, surveying the rationale, Tchuisky tract.*

## **STATISTICAL PROCESSING OF THE RESULTS WHEN YOU RUN THE STATIONS SCANNERS REGISTRATION THE ENGINEERING AND GEODESIC SURVEYS AT THE SITES OF THE TCHUISKY HIGHWAY 880-893, 931-942 KM**

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*The article describes the mathematical processing of results bring the scan data into a single coordinate system-so-called scanner registration stations (standing points) for two sections of the Tchuisky Highway – 880-893, 931-942 km. According to the results of registration of scanner stations from inverse linear-angular serifs on two counts deskewed statistical series registration parameter estimation error of law their distribution method of Fisher score using confidence intervals and obtained numerical characteristics of statistical series, allowing to judge the accuracy of registration.*

**Keywords:** *terrestrial laser scanning, skanner station, inverse linear-angular serif, distribution law, confidence interval, Fischer method.*

## **ANALYSIS OF OBJECTS OF FLOODING BY GROUND WATERS IN THE TERRITORY OF G. OF BARNAUL**

**L. N. Amosova**

Altai state technical university of I.I. Polzunov, Barnaul

*The analysis of flooding of urban areas of Barnaul is provided. Violation of balance of moisture within an active zone, increase in degree of a water saturation of loessial collapsible soil of the physicommechanical properties of soil influencing on change and stability of constructions.*

**Keywords:** *flooding, water-bearing horizon, ground waters, collapsible soil, loessial soil.g horizon, ground waters, loessial soil.*

## **TECHNOGENIC IMPACT OF FLOODING ON THE SOIL BASES AND STRENGTHENING OF THE SOIL MASSIF CHEMICAL FIXING**

**L. N. Amosova, D. A. Marshalkin**

Altai state technical university of I.I. Polzunov, Barnaul

*An assessment of technogenic influence of floodings of city territories of Barnaul. Precautionary and protective actions, effective chemical materials and methods increasing bearing capacity of a soil body and its water resistance. are resulted.*

**Keywords:** *flooding, subsoil waters, a relief, soil, a method.*

## **DEVELOPING THE MOST EFFECTIVE OPTIONS FOR USING THE LAND AREA LOCATED AT THE BARNAUL, PARTIZANSKAYA STREET, 60, 62**

**E. S. Anikina, N. A. Danilova, L. W. Kulikova**

Altai state technical university of I.I. Polzunov, Barnaul

*The article discusses 3 options most efficient use of the land with the object under construction, located in the center of the city of Barnaul. For each option, calculated Techno-economic indicators, the conclusions about the feasibility of their implementation.*

**Keywords:** *principle of most efficient use of real estate, construction in progress, the federal valuation standards, technical and economic parameters of the project, the demolition of the object, dismantling, re-sale of building materials, construction of a house.*

## **THE DEPENDENCE OF THE EFFICIENCY OF THE USE OF MACHINERY FOR EXCAVATION OF THE COMPLEX ORGANIZATIONAL AND TECHNOLOGICAL FACTORS**

**O. S. Annenkova**

Altai state technical university of I.I. Polzunov, Barnaul

*The paper examines the impact of organizational and technological factors: the volume of excavation, the distance between the objects of construction and duration of work on the value of the criterion of efficiency – given the specific costs.*

**Keywords:** *earthwork, the distance between objects, the duration of the work.*

## **DEVELOPMENT OF METHODS FOR INSTALLATION AND DISTRIBUTION EARTHMOVING EQUIPMENT ON THE CONSTRUCTION PROJECT**

**O. S. Annenkova**

Altai state technical university of I.I. Polzunov, Barnaul

*The article discusses the technique of arrangement of the park earthmoving machinery on construction sites, taking into account the total cost of compensation for idle facilities and machines.*

**Keywords:** *earth-moving machinery, building site, a set of module, simple machines and objects.*

## **LAWS OF THE INFLUENCE OF CERTAIN PARAMETERS OF CONSTRUCTIVE FORMS METAL STRUCTURES ON ITS RATIONALITY WITH OPERATING COSTS**

**A. V. Baryshnikov, I. V. Kharlamov**

Altai state technical university of I.I. Polzunov, Barnaul

*The paper presents the results of a numerical experiment conducted to identify patterns of influence of some parameters of structural forms metal structures on its rationality with operating expenses. The numerical experiment was carried out on the basis of the method of choice of rational constructive forms of metal structures with operating costs with the use of established software product PCMS. In the four variants of operation of metal structures we proposed and analyzed taking into account the impact of aggressive environment.*

**Keywords:** *Constructive forms, variants of operation of metal structures, protective coating, rationality.*

## **PROGRAMMING IN MICROSOFT EXCEL OF HEATTECHNICAL CALCULATION OF OUTSIDE BARRIERS**

**I. A. Bakhtina, V. V. Sokolova**

Altai state technical university of I.I. Polzunov, Barnaul

*The main stages of calculation at design of systems of heating of buildings, features of programs for calculation of engineering systems in educational institutions are considered, the software product is developed for heattechnical calculation of the outside protecting designs in the environment of Microsoft Excel with use of the Visual Basic programming language.*

**Keywords:** *systems of heating, heattechnical calculation, program, operators Microsoft Excel, Visual Basic program.*

## **ANALYSIS OF METHODS OF DEVICE OF MONOLITHIC CONCRETE AND REINFORCED CONCRETE STRUCTURES AT NEGATIVE TEMPERATURES OF AIR**

**O. V. Buyko**

Altai state technical university of I.I. Polzunov, Barnaul

*In today's construction market often requires the construction of civil and transport engineering in a short time, despite adverse weather conditions. Experience of doing concrete work in conditions of freezing temperatures has been gained during the Soviet years. However, the intensification of curing processes through the use of additives against freezing and complex supplements, both independently and in conjunction with different heat treatment methods remain relevant.*

**Keywords:** *warm concrete, cold concrete, concrete mixture, rheology, strength, warming up, additives against freezing, negative temperatures.*

## **ENSURING PERSISTENCE PROPERTIES OF CONCRETE MIXTURES WITH HIGH ASH CONTENT BROWN COALS**

**O. V. Buyko, E. I. Kirichenko, A. K. Loginova**

Altai state technical university of I.I. Polzunov, Barnaul

*The mixed cements with high content of fly ash in them attractive for the production of concrete and Ferro-concrete products, from an economic point of view, but have several technological shortcomings. One of the problems is a short time save the properties of concrete mixtures to such sub-*

stances. A possible way of solving the problem is to apply supplements retarders. The article presents research on determining influence on time variation of properties of mixed substances and concrete mixes with ash content of more than fifty per cent.

**Keywords:** portland cement, ashes of the brown coals, mixed cements, organic acids, a concrete mixture, conservation of fluidity, concrete, strength.

## **A CONSTRUCTIVE SOLUTION AND ADVANTAGES OF THE FAÇADE SYSTEM OF FOAM AND METAL PROFILES-SYSTEMS WORKSHEET**

**E. V. Verbitskaya**

Altai state technical university of I.I. Polzunov, Barnaul

*This article provides a preliminary analysis of the possibility of the use of facade systems and metal profiled sheet in the climatic conditions of the Altai territory. The necessary calculations humidity-tion mode of enclosing structures of buildings and constructions was performed by PU, the simulation software WUFI. According to the results of studies of the proposed options enclosing construce using this facade system to meet the requirements of thermal efficiency and durability.*

**Keywords:** facade system, foam, metal profiles-controller sheet.

## **THE USE OF METAL PROFILED LEE-HUNDRED AS A BEARING ELEMENT MONOLITHIC SLABS OF FOAM**

**I. O. Verbitsky**

Altai state technical university of I.I. Polzunov, Barnaul

*This article provides a preliminary analysis of the possible use of profiled metal sheet as support element monolithic slabs of foam. The necessary research of a temperature mode of the slab was performed with the software package SolidWorks. According to the results of conducted researches and calculations, the proposed option constructii monolithic slab of foam with a metal profiled sheet as a carrier element that meets the requirements of resistance to fire and shumozolyatsiya.*

**Keywords:** overlap, foam, metal profiled-tion sheet.

## **LAWS OF PROCESS OF DESTRUCTION OF THE MATERIAL IN THE GRINDING TECHNOLOGY**

**Yu. A. Verigin, Ya. Yu. Verigina**

Altai state technical university of I.I. Polzunov, Barnaul

*In this paper we propose an energy approach to the definition of a natural process of grinding materials mechanically.*

**Keywords:** the structure of the material, durability, dislocation, micro-defects, grinding energy.

## **ENERGY ANALYSIS WORKFLOWS MACHINERY AND EQUIPMENT IN THE CONSTRUCTION**

**Yu. A. Verigin, Ya. Yu. Verigina**

Altai state technical university of I.I. Polzunov, Barnaul

*Provides energy analysis processes of working machines and equipment in the building. The mathematical relationship to optimize the stability of rods destruction process substances in technology construction materials.*

**Keywords:** energy analysis workflows machinery and equipment in the construction, energy consumption, synergy, deformation resistance, grinding, destruction, optimization, stability.

## **INFLUENCE OF MINERAL ADDITIVES ON THE PROPERTIES OF SILICA BRICK**

**A. V. Wolf, E. V. Bozhok, A. A. Ermolaev**

Altai state technical university of I.I. Polzunov, Barnaul

*The analysis of the reasons of destruction of masonry, made of silica brick. The necessity of increase of requirements to quality indicators of silica brick, such as water resistance and corrosion resistance. Influence of different mineral admixtures on the physico-mechanical properties and durability of silica brick.*

**Keywords:** silica brick, mineral supplements, water resistance, durability.

## **ASSESSMENT OF THE TIME WHEN PERFORMING THE ENGINEERING AND GEODESIC SURVEYS USING TERRESTRIAL LASER SCANNING AT THE SITES OF THE TCHUISKY HIGHWAY 698-703 +250, 706-718 KM**

**E. I. Vyatkina**

Altai state technical university of I.I. Polzunov, Barnaul

*At the article the question of quantifying time spent on works by laser scanning at the sites of the Tchuisky Highway 698-703 +250, 706-718 km in total and net time scanning. Describes the features of production works on ground laser scanning when performing engineering and surveying for a complete overhaul of the data sections of the highway R-256 «Chui tract». Shows the quantitative characteristics of the time spent on production work on terrestrial laser scanning these sites.*

**Keywords:** terrestrial laser scanning, laser scanner GLS-1500 TOPCON, scan time, engineering and geodetic survey, surveying the rationale, Tchuisky tract.

## **ASSESSMENT OF THE TIME WHEN PERFORMING THE ENGINEERING AND GEODESIC SURVEYS USING TERRESTRIAL LASER SCANNING AT THE SITE OF THE TCHUISKY HIGHWAY 625-631 KM**

**E. I. Vyatkina, G. I. Muradova**

Altai state technical university of I.I. Polzunov, Barnaul

*Article deals with the question of quantifying time spent on works by laser scanning on a stretch of the tchuisky Highway 625-631 km as a whole and pure the scanning time. Describes the features of production works on ground laser scanning when performing engineering and surveying for the repair of this area of Federal Highway r-256 «Chui tract». Shows the quantitative characteristics of the time spent on production work on terrestrial laser scanning these sites.*

**Keywords:** terrestrial laser scanning, laser scanner GLS-1500 TOPCON, scan time, engineering and geodetic survey, surveying the rationale, Tchuisky tract.

## APPLICATION OF GIS SYSTEMS DEVELOPMENT BUILT-UP TERRITORIES OF BARNAUL

**O. V. Dremova, V. V. Perfilyev, R. S. Syrovezhkin**

Altai state technical university of I.I. Polzunov, Barnaul

*Consider the vector of perspective development of the city of Barnaul on the example of built-up areas. Analyzed the validity of the use of geographic information systems for the development of built-up areas of the city of Barnaul. Proposed GIS application for district development.*

**Keywords:** *development of built-up areas, geographic information system, the old and dilapidated housing, resettlement, comfortable accommodation.*

## AN INVESTIGATION OF TUNED-MASS DAMPERS EFFECT ON FREQUENCY RESPONSE OF HIGH-RISE BUILDINGS WITH STEEL FRAMES

**A. V. Zhukov, A. A. Kikot**

Altai state technical university of I.I. Polzunov, Barnaul

*Investigation of changes in frequency response of a high-rise building steel frame considering undamped structure and three different TMD setups is carried out. Damping devices help to reduce displacements and accelerations of top floors of the building by 40 to 50 per cent.*

**Keywords:** *vibration reduction, TMD, steel frame, SAP2000, Time-History Analysis.*

## DATA EXPORT FEATURES OF TERRESTRIAL LASER SCANNING THE FACADES OF BUILDINGS FOR THE PURPOSE OF BUILDING ARCHITECTURAL DRAWINGS

**K. A. Zabrodina**

Altai state technical university of I.I. Polzunov, Barnaul

*The most time-consuming part of terrestrial laser scanning process (TLS) is handling the scans. Currently there is still no specific regulations of the optimum technology of processing of the data obtained when shooting architectural objects. As most software products for working with point clouds and scans are intended for processing of scan data, to build as architectural blueprints and logical export files in such widespread software like AutoCAD. This article describes the features of NLS data processing in the ScanMaster software product for the purpose of obtaining different types of data for export to AutoCAD.*

**Keywords:** *terrestrial laser scanning, scan, point cloud, export data, a set of edges, surface.*

## USE OF SOFTWARE AT THE SOLUTION OF PROBLEMS OF CONSTRUCTION MECHANICS

**I. K. Kalko, G. M. Busygina**

Altai state technical university of I.I. Polzunov, Barnaul

*The possibilities of software for the solution of problems of construction mechanics in educational process are considered. On examples the most demanded SCAD computer systems and the computing MathCAD environment are considered.*

**Keywords:** *MathCAD, SCAD, construction mechanics, stability.*

## **STATISTICAL PROCESSING OF THE RESULTS WHEN YOU RUN THE STATIONS SCANNERS REGISTRATION THE ENGINEERING AND GEODESIC SURVEYS AT THE SITES OF THE TCHUISKY HIGHWAY 698-703+250, 706-718 KM**

**I. V. Karelina**

Altai state technical university of I.I. Polzunov, Barnaul

*The article describes the mathematical processing of results bring the scan data into a single coordinate system-so-called scanner registration stations (standing points) for two sections of the Tchuisky Highway – 698-703 +250, 706-718 km. According to the results of registration of scanner stations from inverse linear-angular serifs on two counts deskewed statistical series registration parameter estimation error of law their distribution method of Fisher score using confidence intervals and obtained numerical characteristics of statistical series, allowing to judge the accuracy of registration.*

**Keywords:** *terrestrial laser scanning, skanner station, inverse linear-angular serif, distribution law, confidence interval, Fischer method.*

## **STATISTICAL PROCESSING OF THE RESULTS WHEN YOU RUN THE STATIONS SCANNERS REGISTRATION THE ENGINEERING AND GEODESIC SURVEYS AT THE SITE OF THE TCHUISKY HIGHWAY 625-631 KM**

**I. V. Karelina, G. I. Muradova**

Altai state technical university of I.I. Polzunov, Barnaul

*The article describes the mathematical processing of results bring the scan data into a single coordinate system-so-called scanner registration stations (standing points of the device) to plot the tchuisky Highway – 625-631 km. According to the results of registration of scanner stations scheme «station-back point» solved the alignment of statistical series registration parameter estimation error of law their distribution method of Fisher score using confidence intervals and obtained numerical characteristics of statistical series, allowing to judge the accuracy of registration.*

**Keywords:** *terrestrial laser scanning, skanner station, back station, distribution law, confidence interval, Fischer method.*

## **ON THE CAUSES OF THE DESTRUCTIVE PROCESSES DURING SOLIDIFICATION GYPSUM CEMENT COMPOSITE BINDERS**

**V. K. Kozlova, E. V. Bozhok, T. V. Roslyakova**

Altai state technical university of I.I. Polzunov, Barnaul

*The analysis of existing points of view on the mechanism of destruction of gypsum cement stone. The phase transformations occurring during the hardening of gypsum cement binders in the presence of active mineral additives. The prospects of using carbonaceous additives to obtain a defect-free gypsum cement composite binders.*

**Keywords:** *gypsum-pozzolanic cement binding materials.*

## **SULFATED CEMENTS WITH ADDITION OF HIGH CALCIUM ASHES PRODUCED BY LOW-TEMPERATURE COMBUSTION OF BROWN COALS KANSK-ACHINSK BASIN**

**V. K. Kozlova, A. V. Wolf, E. V. Shkrobko**  
Altai state technical university of I.I. Polzunov, Barnaul

*The chemical and phase composition of high calcium ashes, obtained from low-temperature combustion of brown coal Kansk-Achinsk basin. Physico-mechanical properties of composite gypsum cement binding materials made use of as a mineral additive ashes of low-temperature combustion of brown coals.*

**Keywords:** high calcium fly ash, low temperature combustion, gypsum cement binding materials.

## **CHOICE OF WALLS RATIONAL VARIANT OF A SINGLE STORY BUILDING MADE OF SFMB (self-framing metal buildings)**

**E. V. Kudelina, I. V. Kharlamov**  
Altai state technical university of I.I. Polzunov, Barnaul

*The article presents the aspects that influence on the class of building efficiency. One method that can provide the raise of the thermal effectiveness of buildings is the usage of modern envelope buildings. There are variants of walls envelope buildings. Also, a technoeconomic estimation with a selection of the most economical option is completed.*

**Keywords:** Energy conservation, SFMB, thermoprofile, foam concrete, mineral wool, extruded foam polystyrene.

## **SYSTEM ANALYSIS TO THE FORMATION MODEL OF EVALUATING RESIDENTIAL REAL ESTATE**

**L. V. Kulikova**  
Altai state technical university of I.I. Polzunov, Barnaul

*The article is devoted to the nature and structure of the system analysis, selected methods for the formation of semantic web technology assessment activities and assessment of residential real estate, ranked the major factors affecting the total cost. The residential real estate valuation model is based on this results.*

**Keywords:** system analysis, formalization of knowledge, semantic network, a method of expert estimations, real estate, appraisal, assessment parameters, the regulation of appraisal activity, hierarchical model of residential real estate valuation.

## **BINDING MATERIALS FOR 3D-CONSTRUCTION OF CEMENT, LIQUID GLASS AND PLASTICIZERS**

**O. V. Lobanova, G. V. Grishin, A. A. Chechev**  
Altai state technical university of I.I. Polzunov, Barnaul

*In this research studied the depending of the compressive strength and setting time of portland cement with the addition of water glass, plasticizers C-3 and Glenium 115 in different proportions. Also binder composition for the 3D construction are recommended.*

**Keywords:** binding for the 3D construction, superplasticizers, giperplasticizers, the beginning of the setting, reduction of the setting time.



## SETTLEMENT RESEARCH OF EFFICIENCY OF COPPERS WITH A HEATER OF AIR OF LOW TEMPERATURE WITH DIRECT GIVING OF AIR AT NEGATIVE TEMPERATURES

V. V. Logvinenko, A. V. Kaljuzhnaja

Altai state technical university of I.I. Polzunov, Barnaul

*Settlement research of a tubular heater of air of low temperature of traditional configuration with direct giving of external air is executed at negative temperatures. The calculation model on elements of such heater of air of low temperature is developed and calculations of temperatures of gas, air, a wall of a pipe from gas, moisture contents of gases in each element are executed. At a unilateral supply of cold air of a heater of air of low temperature for a copper For NTV PPV of copper E-75-3,8-350 H'M at temperature of external air-20 wasps of loss of heat 3,2% will make, efficiency on the lowest warmth of combustion of fuel of 101,95%. Economic benefit for the heating period of 219 days can be estimated in 14,3 million rbl./year.*

**Keywords:** *a heater of air of low temperature with direct giving of cold air, condensation of water steams of smoke gases, settlement research of fields of temperatures of air, gases, temperatures of a wall of a pipe, moisture content in tubular a heater of air of low temperature, increase in efficiency of a copper.*

## KEY ASPECTS OF MODERNIZATION OF HEAT INSULATION OF PIPELINES

T. E. Lyutova

Altai state technical university of I.I. Polzunov, Barnaul

*Are presented in a structured form of theoretical information about the features and capabilities of modern forms of insulation of pipelines of heating systems; the basic requirements to be met by any insulating material and any thermal insulation construction of heating systems; given the technical and operational characteristics of the most used thermal insulation materials and structures for piping and equipment.*

**Keywords:** *thermal insulation, thermal insulation construction of heating systems, insulation materials for thermal insulation and a vapor barrier.*

## FEATURES AND POSSIBILITIES OF MODERN WAYS OF WATERPROOFING PIPELINES

T. E. Lyutova

Altai state technical university of I.I. Polzunov, Barnaul

*Provides an overview and analysis in a systematic form of theoretical information about the features and capabilities of modern types and methods of waterproofing of Heat pipeline systems; the basic requirements to be met by the materials considered; given the technical and operational characteristics of the most applied waterproofing and corrosion-resistant materials and structures for pipelines.*

**Keywords:** *waterproofing, pipes, waterproofing methods and design of Heat systems for waterproofing materials.*

## FEATURES AND PROSPECTS OF MODERN TECHNOLOGY CONCRETE PRODUCTS RECYCLABLE IN HOUSING CONSTRUCTION

**V. N. Liutov, M. S. Baranowska**

Altai state technical university of I.I. Polzunov, Barnaul

*Provides an overview and analysis of information about the features, capabilities and prospects of modern-technology recycling of concrete products in Ms-lischnom construction; the issues of recycling and reuse of materials from the dismantling of residential buildings, as well as the problems of ecological safety; given the technical and operational characteristics of the methods of processing and recycling of concrete products.*

**Keywords:** reinforced concrete, utilization, secondary processing and reuse of materials.

## APPLIED MATHEMATICAL DESIGN OF PROCESS OF FIXING OF LOESS SOILS STREAM CEMENTATION FOR TERMS OF BARNAUL

**V. N. Lyutov, V. A. Kazicin**

Altai state technical university of I.I. Polzunov, Barnaul

*Some results over of mathematical design are brought for the real terms of three different charts of fixing of the tiled foundation of multistory dwelling building on loess soils of city of Barnaul. Calculations and constructions of results of mathematical design produced in Alterra software adapted to the real terms. The most rational charts of fixing of founding the method of stream cementation for the terms of the investigated loess soils and demonstration of work of software are educed.*

**Keywords:** loess and loesslike soils, injection methods of strengthening of soils, stream cementation, mathematical design of fixing loess and loesslike.

## CONTACT HARDENING CONCRETE WASTE

**V. V. Maltsev, A. I. Myradov**

Altai state technical university of I.I. Polzunov, Barnaul

*Investigated the strength of concrete large aggregate from concrete waste with a plasticizer (Glenium 115, C-3) and mineral (high calcium ash 10-30% silica fume 2,5-7,5%) additives. The dependence of strength increase the strength of the dosage of mineral additives, the solution to the problem of low strength concrete large aggregate from the concrete waste.*

**Keywords:** concrete waste, recycled concrete, mortar part, mineral supplements, the strength of the stone.

## ESPECIALLY TO COMBAT ICE DAMS IN THE MOUNTAINOUS OF ALTAI REGION

**G. S. Merentsova, S. V. Milkina**

Altai state technical university of I.I. Polzunov, Barnaul

*In the mountainous region of the Altai Territory Education icings in the of roads and artificial structures in the holes with a possible exit on the roads often phenomenon. Formed ice dams impede the smooth safe passage of vehicles, in some cases, do not fare possible. It should take into account the condition of the mountain areas in the fight against ice dams.*

**Keywords:** Ice in the mountains, methods of removing ice, eliminating icing spring, the effects of the ice accumulation in the spring, especially elimination of icing in the mountains.

## **BASICS OF EFFECTIVE PREPARATION OF CEMENT MORTAR FOR INJECTION METHOD OF CONSOLIDATION OF SOILS**

**I. V. Noskov, S. A. Ananiev, M. A. Kovaleva**

Altai state technical university of I.I. Polzunov, Barnaul

*Presented effective devices for the preparation of injection solutions and technological methods for increasing the activity of the binders. It is shown that the activation of binding in solution can be significantly reduced consumption of cement, which ultimately contributes a lot to the reduction of production costs.*

**Keywords:** soil, solution, injection, activation, technology, method.

## **CONSTRUCTIVE SOLUTIONS AND CALCULATION METHODS OF FENCING OF DEEP EXCAVATIONS**

**I. V. Noskov, E. P. Shiredchenko**

Altai state technical university of I.I. Polzunov, Barnaul

*Provides a constructive solution to the fencing of pits, using different types of piles and modern technology of concreting. It is shown that when designing underground and buried structures should be provided by the technical solutions ensuring reliability, durability and efficiency of the designed structures at all stages of construction and operation.*

**Keywords:** soil, pile, pit, method of calculation, technology.

## **CONTACT HARDENING CONCRETE WASTE**

**G. I. Ovcharenko, A. V. Viktorov, D. M. Nazarov**

Altai state technical university of I.I. Polzunov, Barnaul

*Investigated the strength of hyper-pressed at 60, 80 and 100 MPa stone from the mortar part of the concrete waste with mineral additions such as of quartz sand with a fineness modulus of 1.5 and ground limestone, granulated blast furnace slag, fine silica fume without additives and with the addition of 5-15% cement. The dependences of the strength of the stone from fineness the mineral filler and the specific pressing pressure were obtained.*

**Keywords:** mortar part of the concrete waste, hyper-pressed, mineral additions, strength of the stone.

## **HIGH FROST RESISTANCE SAND-LIME BRICK**

**G. I. Ovcharenko, V. M. Karakulov, T. O. Tambovski**

Altai state technical university of I.I. Polzunov, Barnaul

*Studied strength and frost resistance of autoclaved silicate material based on quartz sand with different content of clay loam. It is shown that the presence in the mass loam material significantly increases the strength from 15 to 35 MPa, but reduces it to 20 cycles of frost resistance. Increase the stone frost resistance can be a partial replacement loam of silica fume. In this case, the material can with stand at least 35 freeze-thaw cycles. Obtain statistical mathematical models depending on the strength of the stone on the composition of the raw mixtures and frost cycles.*

**Keywords:** loamy sand-lime brick raw materials, strength, frost resistance, silica fume, mathematical models.

## **RESTORING THE WATERPROOFING OF BUILDINGS AND STRUCTURES WITH THE USE OF SURFACE AND BULK WATER REPELLENCY**

**M. A. Osipova, A. A. Pinyaskin**

Altai state technical university of I.I. Polzunov, Barnaul

*The paper is a generalization of the author's research on the hydrophobic structures of buildings and structures in order to increase their durability and improved performance properties. Emphasizes the need to protect the building materials and structures from moisture, physical and chemical bases of processes of water-repellency, ways of making water-repellent properties and hydrophobized materials.*

**Keywords:** *waterproofing, injection waterproofing, ground and man-made water, the reliability and durability of buildings and cultural heritage.*

## **INJECTION GIDROFOBIZATION'S APPLICATION DURING CREATION OF THE HORIZONTAL WATERPROOFING OF DESIGNS OF BUILDINGS**

**M. A. Osipova, A. A. Pinyaskin**

Altai state technical university of I.I. Polzunov, Barnaul

*In article application of an injection gidrofobization during creation of a horizontal waterproofing of designs of buildings by materials of which is considered the brick ceramic, silicate and foam concrete, on the example of use of an organic silicon gidrofobization is.*

*The assessment of the received results is carried out and shortcomings of this method of creation of a horizontal waterproofing are considered.*

**Keywords:** *destructive effect of underground waters, gidrofobization, injection waterproofing.*

## **THE EFFECTS OF FINE MINERAL ADDITIVES ON THE STRUCTURE AND STRENGTH OF CEMENT STONE**

**A. O. Sadrasheva, A. V. Pesotsky**

Altai state technical university of I.I. Polzunov, Barnaul

*This paper presents the effect of various mineral additives on the structure and strength cement stone and on concrete. Studied a group of mineral additives that influence formation of the C-S-H gel - the main phase of hardening cement paste.*

**Keywords:** *cement stone, the mineral additives, wollastonite, C-S-H gel, calcium silicate hydrate.*

## **SOLVING THE PROBLEM BY CALCULATING VIBROGRINDERS JUSTIFY THEIR PARAMETERS MODES**

**A. V. Sartakov**

Altai state technical university of I.I. Polzunov, Barnaul

*Considered movements loading into the mill in vibrogrinders, clarified laws governing the motion, based on which propose the methods of substantiation parameters of operating modes of vibration grinders.*

**Keywords:** *grinding, vibrogrinders, loading inside the mill, dispersion.*

## THE DOMESTIC APPLICATION OF ADHESION PROMOTERS IN TECHNOLOGIES OF WARM ASPHALT MIXTURES IN THE ALTAI REGION

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*The article is devoted to study the possibilities of applying the adhesive additives of domestic production in the technology of preparation and use of asphalt mixtures with lower temperatures of the production, laying and compaction. Experimental data on changes of technological properties of the organic binders and asphalt mixtures prepared in the presence of complex additives that improve the adhesion to the stone materials and the ability to seal at low temperatures.*

**Keywords:** adhesion, asphalt, bitumen, water resistance, binder, additive, strength, mixture, crushed stone.

## INFLUENCE FILTRATION ANISOTROPY ON PRECIPITATION ROCK FOUNDATIONS

A. A. Sobolev

Altai state technical university of I.I. Polzunov, Barnaul

*The influence of the anisotropy of filtration macroporous loess soil at the rate of precipitation of foundations, made a comparison of the speed of precipitation of isotropic and anisotropic permeability of soils by taking into account the correction factor to the filtration anisotropy, conclusions on the effect of the filter on the anisotropy of the properties of loess soil.*

**Keywords:** loess soils, water permeability, sediment, filtration anisotropy, filtration consolidation.

## A LIFECYCLE MANAGEMENT OF REAL PROPERTY. PROCESS AUTOMATION

N. S. Solovyeva, V. V. Sokolova

Altai state technical university of I.I. Polzunov, Barnaul

*This article discusses the tools for action planning for lifecycle management of the property and to implement them in the software package in MS Excel medium by using object - oriented programming language.*

**Keywords:** management of real property, lifecycle of real property, software system lifecycle management of the property, VBA Excel.

## A LIFECYCLE MANAGEMENT OF REAL PROPERTY

N. S. Solovyeva, Yu. V. Khalturin

Altai state technical university of I.I. Polzunov, Barnaul

*In this article authors emphasize an importance of system approach to a lifecycle management of real property. Performed researches are described that became a base for a theoretical model.*

**Keywords:** real property, management of real property, theoretical model of management of real property, lifecycle of real property.

## THE USE OF SCAD FOR THE STATIC CALCULATION OF CIRCULAR ARCH SHAPE

A. N. Troshkin<sup>1</sup>, G. M. Busygina<sup>2</sup>

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*Implementation of the job of a snow and wind load for an arch according to the Set of rules «Loadings and influences» in exchange Construction Norms and Regulations is considered. In an example definition of estimated combinations of efforts, and also determination of responses of support is given. For execution of all calculations the computing environment of MathCAD allowing to work with sized variables is used.*

**Keywords:** SCAD, MathCAD, arch, static calculation, load.

## ORGANIZATIONAL MODEL IMPLEMENTATION INVESTMENT PROJECT IN CONSTRUCTION

G. E. Frantsen, Ya. G. Mozgovaja

Altai state technical university of I.I. Polzunov, Barnaul

*Based on the analysis of domestic and foreign experience the article presents different phases of the life cycle of hardware of the project, the proposed organizational model of the investment project in the construction. Developed the organizational processes in management Institute project with reference to time scale. Studied and described by information flows at every stage of the project.*

**Keywords:** construction organization, project management, planning.

## INVESTIGATION OF OPERATIONAL PROPERTIES SEDIMENT HEATER IN THE OUTER WALL

E. V. Khatina

Altai state technical university of I.I. Polzunov, Barnaul

*For research of thermal and processing properties of insulation materials during field experiments were carried out of the heating season, several units simulating different variants insulation of existing building walls were collected: the external and internal insulation, and also an option with a ventilated air gap. In addition, the filling insulation was split into fractions to test hypotheses about the influence of particle size of fill insulation on its thermal characteristics.*

**Keywords:** thermal and processing properties, thermal resistance, thermal conductivity.

## EVALUATION OF ELASTIC-PERFECTLY-PLASTIC MATERIAL MODEL ON THE BASIS OF LABORATORY TESTS ON DEFORMABILITY OF SOIL BED

L. V. Khalturina, Yu. V. Khalturin

Altai state technical university of I.I. Polzunov, Barnaul

*Comparative evaluation between results of elastic-perfectly-plastic material model calculations and laboratory tests on clayey soils is presented.*

**Keywords:** soil bed, stresses, strains, analytical model.

## **SURVEYING OF AUTOMOBILE ROAD «NOVOTYRYSHKINO – BELOKURIHA» PRIOR TO PERFORMANCE OF INJECTABLE WORK**

**B. M. Cherepanov, S. A. Ananiev, M. A. Kovaleva**

Altai state technical university of I.I. Polzunov, Barnaul

*In article there are research results of automobile road «Novotirishkino – Belokuriha». There are description of researching work about grouting subsoil in laboratory conditions on experimental assembly with trial aim. There are attained results of formation steady zone in depending on inject pressure and water and cement ratio in injectable aperture.*

**Keywords:** automobile road, soil exploration, grouting subsoil, water and cement ratio.

## **ANALYSIS CONDITIONALS TEST METHODS OF PILE CANTILEVERING**

**B. M. Cherepanov, D. S. Lazareva**

Altai state technical university of I.I. Polzunov, Barnaul

*Practically, there are four test methods of pile cantilevering. There are calculate method, cone penetration test or dynamic testing of soil, dynamic and constant rate of penetration test. Basic aim of this research is comparison ultimate static frictional resistance which got by dates of penetration test and pile cantilevering which calculated by computational method.*

**Keywords:** pile, pile cantilevering, field tests of pile, test method, permanent load, production pile.

## **SELECTIVE COATING OF MODERN SOLAR COLLECTORS**

**A. V. Shashev<sup>1</sup>, E. A. German<sup>1</sup>, Yu. Yu. Pochekailov<sup>2</sup>**

<sup>1</sup> Altai state technical university of I.I. Polzunov, Barnaul

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*In this scientific article compares properties selective coating of modern solar collectors. To evaluate the effectiveness of selective coating using the ratio of absorbance to the emissivity  $\alpha/\epsilon$ . Describes methods of applying selective coatings on various substrates absorbers. The article also refers to the durability of solar collectors.*

**Keywords:** renewable energy, solar energy, solar panels, selective coatings.

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