

IMPROVEMENT OF DURABILITY OF A POLYMER CONCRETE BASED ON POLYBUTADIENE BINDER

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ABSTRACT

According to the available data, the most aggressive environment for a polymer concrete based on polybutadiene binder (*RubCon*) is 36% hydrochloric acid solution. After a year of testing in it the *RubCon* strength was reduced by 31%, its mass absorption amounted to 1.14%, and micro-cracks and blisters emerged on the material surface. This resulted in the need for development of new *RubCon* compositions with improved durability. This article is mainly focused on the most simple and accessible method of *RubCon* chemical resistance and durability improvement consisting in addition of active admixtures. Based on the results of the performed study, a conclusion can be made that addition to *RubCon* content of multivalent metal oxides (TiO_2) and additives actively interacting with aggressive environment (BaSO_4) allow to increase its chemical stability factor by 12 and 11% respectively, besides the addition of titanium oxide to the composition increases the initial strength of the composite.

RESISTANCE OF A POLYMER CONCRETE BASED ON POLYBUTADIENE BINDER TO ORGANIC AND INORGANIC ACIDS

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ABSTRACT

A study of a polymer concrete based on polybutadiene binder (*RubCon*) chemical stability in solutions of inorganic acids was carried out, in the course of which researchers experimented with a 30 %-solution of sulphuric acid, a 70 %-solution of sulphuric acid, a 5 %-solution of phosphoric acid, a 3 %-solution of nitric acid, a 5 %-solution of hydrochloric acid and a 36 %-solution of hydrochloric acid according to the methodology of GOST (government standard of Russia) 25246-82. Based on the results of interim tests they determined a change of sample weight Δt , %, the chemical stability coefficient – K_{xc} , the coefficient of modulus deformation change – K_E ; the depth of aggressive medium penetration into the composite — x , mm.

X-RAY FLUORESCENCE SPECTROSCOPY ANALYSIS OF PYROLYZATE OF A POLYMER CONCRETE BASED ON POLYBUTADIENE BINDER

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ABSTRACT

Results of X-ray fluorescence spectroscopy analysis of pyrolyzate of a polymer concrete based on polybutadiene binder (*RubCon*) on the base of liquid polybutadiene oligomers of grades SKDN-N and PBN are presented. On the base of the research elemental compositions of initial and burnt rubber binder are determined.

STRENGTH AND PERFORMANCE EFFICIENCY OF RUBBER CONCRETE

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ABSTRACT

Analysis of applicability of dynamic method of loading for calculation of polymer concrete based on polybutadiene matrix (*RubCon*) has been carried out. A way of evaluation of unknown parameters in expression of durability on results of measurement of prism strength has been offered. The article presents mathematical treatment of results of measurement of prism strength of *RubCon* at various temperatures by the proposed way. Calculated values correlate satisfactorily with experimental ones.

FIBER-REINFORCED RUBBER CONCRETES

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ABSTRACT

For products and structures operating under conditions of chemical attack the matter of cracking resistance is top urgent as at cracks growth the aggressive medium penetrating inside the section will significantly deteriorate load-bearing capacity of the element as a whole. The efficient solution of the above mentioned problem is production of fiber-reinforced composites on the base of corrosion-resistant materials, in particular polymer concrete. A perspective direction for solution of the mentioned problem is creation of new generation composite materials on the base of polybutadiene oligomer belonging to the class of liquid rubbers reinforced with fiber – so called fiber *RubCon* (fiber rubber concretes), possessing high chemical resistance, cracking resistance, strength and other favorable performance properties. Some aspects of the fiber reinforcement *RubCon* with fibers produced from metal cord waste are considered in the paper.

STRESS – STRAIN CHARACTERISTICS OF FIBER POLYMER CONCRETE BASED ON POLYBUTADIENE BINDER

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ABSTRACT

Polymer concrete based on polybutadiene binder (*RubCon*) is characterized by favorable deformation-strength characteristics, the highest resistance to aggressive environments, good electrically-insulating and damping properties, high adhesion to various kinds of surfaces, etc. The reinforcement with fibers not only raises cracking resistance threshold but also increases resistance of the material to impact effect which is important for enterprises with presence of constantly acting dynamic loads (foundation of presses, etc.). The stress- strain characteristics of fiber *RubCon* is considered.

STRENGTH CALCULATION FOR OBLIQUE SECTIONS OF BENDING ELEMENTS MADE OF RUBBER CONCRETE

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ABSTRACT

Strength calculation of oblique sections of bending elements made of rubber concrete based on vulcanized polybutadiene matrix is presented.

STUDY OF FIBER REINFORCED RUBBER CONCRETE STRUCTURAL ELEMENTS IN BENDING

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ABSTRACT

The goal of these studies was to investigate strength and crack-resistance of normal cross-sections as well as deformability of bending elements of building structures made of concrete based on vulcanized polybutadiene binder (*RubCon*), reinforced with conventional longitudinal rods and introduced steel fiber.

STUDY OF T- FLANGE RUBBER CONCRETE BENDED BEAMS

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ABSTRACT

The paper presents the testing results of reinforced rubber concrete (polymer concrete with polybutadiene binder) T-section beams, as well as comparison of the data obtained by the beams work modeling based on the finite element method (FEM). The beams behavior was studied by performance of experiments, the T-beam finite element model was developed, the calculated width of T-beam overhanging flange involved in the work was determined.

THERMAL RESISTANCE OF RUBBER CONCRETE BASED ON BUTADIENE OLIGOMER

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ABSTRACT

Thermal resistance of the specimens made of polymer concrete based on butadiene oligomer binder (*RubCon*) was determined by Differential Thermal Analysis (DTA) method. Obtained results allow to estimate influence of containing mixture on thermal destruction process. Ways of the *RubCon* mixture optimization based on operating conditions are suggested

WEAR RESISTANCE COVERINGS ON THE BASIS OF OLIGODIENS

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ABSTRACT

Quantitative dependences of resistance of polymeric layers to influence of the aggressive abrasive pulps are established, allowing purposefully to design rational structures of protective compositions, to define a thickness of the specified layers effectively protecting a substrate

RESEARCH OF CEMENT MATRIX FILLED WITH CARBONACEOUS ADDITION

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ABSTRACT

Cement binding materials, containing filler on the basis of calcium carbonate at the rate of 40 % from the cement body. The article reveals the dependence of the cement stone strength on the level of filling it with calcium carbonate as well as dispersive capacity of the addition and cement. Filling cement with calcium carbonate leads to the saving of the binding agent. Cement stone strength depends on the cement dispersive capacity as well as on the addition dispersive capacity. As the addition grinding fineness increases the cement strength decreases. The data of tests and experiments to draw a conclusion that filling cement paste with calcium carbonate stable Water/ Cement Ratio allows to replace 30- 35% of the cement with the aggregate without cement strength reduction.

PROPERTIES OF FILLED CEMENT COMPOSITIONS DURING TURBULENT MIXING

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ABSTRACT

The effect of the rotor speed and the mixing time on properties of the binder during turbulent mixing is studied. The results of the analysis have shown that activation of the cement binder during mixing in a turbulent mixer causes an increase in compressive strength of this binder as compared to the reference samples. The study has established that mechanical activation of the cement binder during mixing in the mode of developed turbulence allows to manage its structure formation. Mixing in optimal modes leads to a 20-34% increase in cement paste plasticity, and cement stone durability increases by more than 50% at early stages of solidification.

EFFECT OF POLYMER-CEMENT PROTECTION ON CRACK RESISTANCE OF REINFORCED CONCRETE BENDING ELEMENTS

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ABSTRACT

The paper presents experimental data on the increase in cracking of reinforced concrete elements coated with polymer-cement protective layer against aggressive environments.

APPLICATION OF DIGITAL COLORIMETRY IN CHEMICAL ANALYSIS OF BUILDING MATERIALS

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ABSTRACT

The opportunities of digital colorimetry in control of phenols in building materials using color tests are considered.

CONSTRUCTIONAL COMPOSITES BASED ON NON-ISOCYANATE POLYURETHANE

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ABSTRACT

The paper presents the bases of synthesis and manufacture of non-isocyanate polyurethanes by domestic and foreign manufacturers. Justification of their use as environmentally safe binding building composites are presented. Moreover, the paper presents the results of experiments performed for identification of constructional properties non-isocyanate polyurethane concrete along with the prospects for the use of developed composites in components of buildings and structures in severe environmental conditions.

MONOLITHIC REINFORCED CONCRETE FLAT PAN FLOORS OF THE INTEGRATED SPANS

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ABSTRACT

With the increasing proportion of monolithic reinforced concrete buildings is proposed improvement existing forms of rational design of floors, reducing their weight and material costs while maintaining the necessary degree of operational reliability. Variants of monolithic concrete floors a frame buildings and structures with the longitudinal and transverse cross-beams is considered, as well as construction nodes and shuttering of floors. It were held the comparison of these floors with their analogs, the improvement of methods of calculation and the definition of interaction force of cross beams of coffered floors, the increase a economic efficiency and reliability of the bearing building structures in the design and production work. It was received practical scientific substantiation of rational design solutions coffered flat floors with a minimum thickness of the slab and the various systems of cross elements with development of recommendations for the design of the proposed system floors with permanent shuttering.

**EARTHQUAKE RESISTANT OF CONCRETE REINFORCED RESIDENCE BUILDING:
ESTIMATION OF ITS GEOMETRIC PARAMETERS**

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ABSTRACT

The practical method for estimation of seismic resistance of reinforced concrete dwelling house at the stage of its architectural designing is proposed. The method is based on Israeli Standard no. 413 (Design Provisions for Earthquake Resistance of Structures, SI 413, 1995)