**Abstracts**

**Vol. 7 No. 2**

**Michał BOŁTRYK, Anna KRUPA**

*Frost resistance of cement composites with organic fillers*

The paper presents the results of research on the modification of cement composites with organic fillers air entrainers. For this purpose an optimized composition of the admixture is added in an amount of from 0 to 4% of the weight of the cement. Based on research carried out on cubic samples of dimensions 10×10×10 cm determined the effect of adding admixture on selected physical and mechanical properties of cement composites: apparent density, compressive strength and frost resistance. Based on the obtained results it was established that the developed variants of prescription degree of frost resistance of the composite cement is F25.

**Monika DYBOWSKA-JÓZEFIAK, Krzysztof PAWŁOWSKI, Maria WESOŁOWSKA**

*Numerical analysis of hygro-thermal parameters for external walls – balcony slab joints in terms of new thermal requirements*

The paper includes a detailed comparative analysis of thermal parameters of the double layer connectors of exterior walls with balcony slabs. The results of numerical calculations of selected solutions involving structures and materials are presented herein. For numerical calculations the joints, which connects outer wall with balcony plate, using various layers of the specific materials, were selected. In order to present the parameters of temperature and humidity of thermal bridges, the numerical analysis was performed by TRISCO computer programme. On the basis of the results the practical conclusions were drawn for design and construction. The detailed specifications of thermal parameters by means computer programme for these type of joints, allow us to receive an appropriate estimation of heat loss and temperature distribution, in order to avoid mistakes at the stage of the construction and operation of buildings.

**Anna KACZMAREK, Maria WESOŁOWSKA**

*Research methodology proposed for resilience of contemporary facing walls*

The article refers to proposition of research methodology for durability prognosis for facial walls. In present fast technology development there are new materials introduced to construction, and although their properties are known there is not necessary experience regarding their durability and resistance to influences of environmental impact for many years. In authors research there is possibility of migration of soluble compounds originating from the same ceramic material as well as from mortars in laboratory and field tests. After the analysis of European construction regulations the authors stated that they have not been prepared in such state to be a sufficient base for evaluation of durability of a facial wall. This element was left for designers decision, which results often in accidental choice of compound materials.

**Małgorzata A. LELUSZ**

*Suitability testing of fly ash from biomass combustion for the cement concrete production*

Secondary fuels are increasingly used for power generation in power plants. Biomass, considered as a zero-emission fuel, is more often used in power plants, recently. The paper aim was to assess the possibility of using fly ash from the biomass combustion for the production of cement matrix composites. In the laboratory research ashes from the combustion of: wood biomass, co-combustion of coal and biomass and combustion of coal alone were used. The research results of the development in compressive strength of concrete containing fly ash in an amount up to 40% by mass of the binder are presented. The addition was treated as a substitute for cement. Pozzolanic properties of the ashes were tested and the impact of the content of ash from biomass combustion hydration heat of cement were assessed. The study showed that there is a possibility of economic utilisation of fly ash from the combustion of wood biomass for the cement concrete production.
Dorota MAŁASZKIEWICZ
**Influence of high range water reducing admixtures on rheological properties of cement mortars**

The influence high range water reducing admixtures (HRWRA) on the rheological properties of cement mortars and changes of these properties with time were investigated. Natural postglacial sand 0/4 mm was used as a fine aggregate and cement CEM I 42.5 R was used as a binder. Four commercial superplasticizers were selected for these examinations: two modified polycarboxylates, one modified polynaphthalene polymer and one universal superplasticizer based on naphthalenes (FM). The flow of mortars and the change of flow with time was measured. Rheological properties were expressed in terms of Bingham model parameters g (yield value) and h (plastic viscosity) and measured using rheometrical test. Based on test results it was found out that admixture dosage in order to achieve the same flow differs despite the same chemical base of superplasticizer. Also efficiency in time is different for tested admixtures. Evaluation of yield value g and the range of changes of this parameter with time allows to select most adequately superplasticizer for the given cement.

Vadzim I. NIKITSIN, Valery. A. KOFANOV, Beata BACKIEL-BRZOZOWSKA
**Evaluation of the influence of wind-driven rain on moisture content in cellular concrete wall boards**

The non-stationary moisture level of a cellular concrete wall board in a heated utility building located in the northern part of the town of Brest (Belarus), depending on climatic influence, was assessed in this work. The results were obtained both in a calculation experiment and a physical test. The calculation experiment was performed using TWiND computer application elaborated by the authors. It was observed that wind-driven rain intensifying the process of free capillary moisture transfer is the main reason for the high moisture levels in cellular concrete. A comparative analysis of the results of the physical test and the calculation experiment showed that the THSS application elaborated by the authors enabled to predict the actual moisture levels of the shielding structure under study accurately enough when precise data concerning the thermal and physical characteristics of the materials as well as the occurring climatic influences had been submitted.

Joanna Agnieszka PAWŁOWICZ
**Reflection of a laser beam from objects made of homogenous materials of multiple colors - case study**

The terrestrial scanning technology allows to collect data about an object and use it to create a 3D image thereof and then analyses it in a variety of ways, e.g. by performing an evaluation of the technical condition of a building or by diagnosing different irregularities or damages to its structure. The usefulness of such data depends, to a large extent, on the method and accuracy of measurements. Measurements performed by means of laser scanners depend largely on the quality of the beam reflected from the surface of a target object and returning towards the receiver. The strength of a returning beam is influenced by the reflective properties of the surface of a target object, such as its color, texture, temperature and moisture content. These properties may result in certain, sometimes serious errors during scanning and interpretation of different surfaces. In some cases, the color of a target object is critical for the intensity of reflection of a laser beam from such surface. This article presents a test illustrating the relationship between different types of multicolor samples and the intensity of reflection of a laser beam. The results are presented, among other things, by means of intensity maps.

Marta SKIBA, Maria MRÓWCZYŃSKA, Anna BAZAN-KrzywoszaŃSKA
**Market potential for energy efficient renovations in housing of Zielona Góra**

The paper presents an analysis of conditional energy savings for energy-efficient renovation of housing in Zielona Góra. The potential was determined on the basis of technology and a year of the construction of buildings, kind of buildings and dominating way of heat and power supply. The calculated potential was presented as the value of the necessary investments to reduce energy consumption by 1 kWh/m².
Elżbieta SZCZYGIELSKA, Viktar TUR

Alternative methods of the concrete compressive strength compliance assessment based on small groups of test results

The article presents two new compliance criteria for assessment of the conformity concrete compressive strength, which can be used as an alternative method to the conformity assessment procedure in accordance with PN-EN 206: 2014-04. These criteria were developed using order statistics, when fulfilled, recommended by ISO 12491: 1997 confidence level and make it possible to assess compliance based on small groups of test results without the prior information about the type of PFD and the standard deviation. The application of the new criteria allows to eliminate the uncertainty that occur when the compatibility of concrete compressive strength at the initial production stage according to PN-EN 206: 2014-04 is assessing. Presented a new method can also be used in the identity testing of compressive strength and assessment of concrete strength in the existing structures.