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Abstracts
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Marek J. CIAK
Termokinetic aspects of predicting the efficency of concrete admixtures

Admixtures are significant in modern concrete technology. However, their effective use is very often difficult due to the complex mechanism of their influence on the main stages, such as: adsorption, dissolution, chemical reactions and others. The study of these processes clearly indicates that regardless of the admixture mechanisms of interactions, they all influence the kinetic course of these processes and thereby the intensity and magnitude of the thermal effects. Based on the studies the basic assumptions and criteria for assessing the effectiveness of thermokinetic admixtures have been developed.

Tadeusz CHYŻY, Monika MACKIEWICZ
Conception and application of special onedimensional finite elements

The conception of special finite elements for analysis of structures with variable stiffness areas is presented in the paper. The elements are called as a multi-area elements and their implementation in form of simple one-dimensional elements is presented. The application of these special elements helps to reduce the number of finite elements (unknowns) and thereby to reduce the computational calculation time, compared with standard FEM solution. The conception is based on the assumption that area of the structure with different stiffness and geometrical parameters described by a single element. The stiffness matrix for multi-area element is determined in explicit form by the summation of the stiffness matrices of component sub-areas included in the finite element. Therefore the area of the finite element is divided into rectangular sub-areas with various geometric and stiffness parameters. In order to confirm the accuracy of the presented conception assumptions, comparative analysis was made and potential area of application for one-dimensional special elements were indicated.

Walery JEZIERSKI, Nataljya KUZNECOVA
Application of wastes from chip-cement board production in cement composites

The paper presents the experimental results of the effect of addition of wastes from chip – cement board production on mechanical properties of cement composites. In accordance with the intended objective, compressive strength (answer Y_1) and the bending strength (answer Y_2) of cement mortar specimens were tested. The variable parameters were: cement contents (factor z_1), natural sand contents (factor z_2) and waste contents (factor z_3). Local symplex planning with limited variation range of the factors was applied in the experiment. Based on the research results, mathematical models of the analyzed dependencies were developed. Proportions between cement, natural sand and wastes were determined. It gave a starting point in determining the use of wastes in the production of cement composites..

Magdalena NAKIELSKA, Krzysztof PAWŁOWSKI
Solar chimney as example of passive cooling system in building

Nowadays, searching new solutions is a worldwide trend in creating buildings. Those solutions enable a comfortable use of building structures in harmony with natural environment and ensure reducing energy consumption. The article presents the issues connected with the ventilation of building structures which do not generate a rise of the maintenance costs in building. Based on the available literature, some exemplary solutions that make it possible to reduce the temperature in rooms in a way other than by installing air conditioning systems were shown. The description of a research stand and conducted research, confirming the legitimacy of using a solar chimney in order to intensify the air exchange in a room in parallel with a night ventilation of the room in the summer time, were presented.

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Jerzy OBOLEWICZ
Coordination of building investment process

Practice resulting from the implementation of the construction investment process shows that coordination process becomes necessary. Investors more and more often use the so-called institutions of substitute investor, entrusting a portion or all of the duties related to the preparation, conducting and coordination of actions of participants of the investment process. The detailed definition of the scope entrusted to the inspector substitution activities requires identification of all activities needed to carry out the planned investment. This article reviews the literature on structural elements of the process and the organizational model of the construction investment process, as a tool for coordination with the level of the investor, was proposed.

Krzysztof PAWŁOWSKI, Magdalena NAKIELSKA
The analysis of physical parameters of external walls and their joints regarding the use of modern heat insulating materials

In connection to the introduction in 2014 of new and stringent heat and humidity requirements in Poland, making correct and detailed calculations and analyses is becoming extremely important and thus, those calculations should form the basis of choosing structural and insulating solutions. The construction market has been offering a lot of modern solutions for heat insulating materials which are slowly replacing traditional solutions. Therefore, there is a need for developing the guidelines that would support designing in accordance with new heat and humidity requirements regarding the application of professional computer programmes. The report presents the characteristics of technical parameters of modern heat insulating materials and model structural and material solutions for external walls and their joints. The calculations of physical parameters of external wall barriers and their joints have been made including heat and humidity requirements as well as the achievement of the low-energy standard of a building. Owing to the calculations that have been made, the design guidelines have been established within the scope of correct material system development of external wall barriers and their joints with reference to heat and humidity.

Daniel PRZYWARA, Adam RAK
Evaluation of schedule labour costs in relation to production delays

Rational management of renewable resources means of production is the basic criterion for assessing the quality of the schedule, both in terms of generated production costs and labour time involved in production and equipment. The above-mentioned factors, in addition to the built-in materials, constitute direct price-setting elements. The comparison of labour costs incurred can be applied in case of less than planned efficiency of work, organizational disruptions affecting the duration of processes, or the distribution of different wages for working hours. The article attempts to estimate the changing costs of production labour, which is prone to periodic fluctuations in the number of independent work teams, appointed to overcome the unplanned delays. Tests were carried out using the earned value method.

Elżbieta SZAFRANKO
Possibility of using multi-criteria analysis in the investment process

The process of investment is extremely complex and activities related to its implementation can be divided into several stages. The preparation stage is the most important of them. At the planning stage a number of decisions concerning, among others choice of location, choice of materials and technological solutions should be taken into account. The choice of the final solution may depend on many factors and making a decision in a direct way is extremely difficult. In complicated cases, it is necessary to support the use of mathematical methods. Due to the multiplicity of the considered factors methods of multi-criteria analysis are particularly useful. The article presents the possibility of supporting different decision problems using multi-criteria analysis. The procedure is exemplified by the analysis of the choice of location of the residential project, variants of road investment and choice of materials and construction solutions in the building object. The analysis of different methods shows their usefulness in cases of investment analysis of various features and functions.

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Dmitry ZHDANOV, Wyacheslav ULASEVICH

Nonlinear analysis method for arch-shaped shell roofs made of cold-formed steel profiles

The paper deals with the problem of static structural analysis of shallow arch-shaped shell roofs assembled from curved cold-formed steel profiles. A nonlinear analysis procedure has been proposed to estimate the stress-strain state of such roof structures. It is based on two interrelated analysis models developed for the purpose – namely, an action effects model used for the static analysis of deformational behaviour of shallow arch-shaped structural systems, and a resistance model, for strength analysis of cold-formed steel profiles.