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The results of selected strength tests of the adhesive layer of radiant heater with lightweight construction

The paper presents the results of strength tests for lightweight radiant heater made in so called dry technology. One of its features is a very low thickness due to wet or dry screeds replaced by the fiberglass mesh structure with the adhesive cement. The research of pull-off, water absorption and frost resistance of the radiant heaters without the heat dissipating elements (heat diffusers) were carried out for the selected adhesives. The results confirm the complying with the conditions of applying insulation boards EPS and XPS in the adopted design of this radiant heater by using a fiberglass mesh, except applying it for protection against snow and ice.

Marta KOSIOR-KAZBERUK, Rafał WASILCZYK

Analysis of deflection and cracking of concrete beams with non-metallic reinforcement

The behaviour of model beams made of concrete with basalt reinforcing bars (BFRP) in three-point bending test was analysed. The strength parameters of BFRP bars were tested. The bending capacity, deformation of concrete and beam deflection were determined. The obtained results were compared with the results of the deflection calculation based on the ACI 440: 1R-06 standard. Crack propagation in the model beams under load was analysed using the Aramis 5M optical measuring system. Due to the strength characteristics of the composite reinforcing bars, the beams exhibited significant tensile strains, which resulted in the development of cracks of considerable width. A linear dependence of the model beam deflection versus load was observed. It has been found that the ACI 440: 1R-06 calculation procedure allows to determine deflections of beams reinforced with BFRP bars under short-term load.

Przemysław LAZAR

Construction and analysis of the numerical model of the theoretical building structure

The article presents the process of building and computational analysis of a multi-storey building model with a wall structure subjected to standard construction loads and mining effects of deformation of the substrate in the form of horizontal deformations of the mining substrate and the curvature of the convex mining area. The building modelling process and its computational analysis were made using the Autodesk Robot Structural Analysis software, which proved to be a useful tool for doing such work. On the basis of computational analysis, the importance of horizontal deformations of the ground substrate has been shown to cause damage to buildings located in mining areas.

Marzena MATEJCZYK, Aleksandra GOLONKO, Ewelina CHILMON

Aloe Vera – selected biological properties

Aloe as a folk medicine with comprehensive health-promoting properties has been known to humanity for hundreds of years. Aloe extracts are very popular among pharmacologists, medics and cosmetologists. It was demonstrated that the individual components of the aloe gel are antioxidants, stimulants of the immune system, have anti-cancer properties, lower blood sugar and lipid levels, and have a positive effect on wound healing, burns and anti-inflammatory effects. Recently, several significant papers have been published in which strong anti-cancer properties of selected aloe components have been demonstrated. Hence, the American Food and Drug Administration (FDA) has endorsed scientific research on the use of *A. vera* in the treatment of cancer and AIDS in humans. In the presented review, the general properties of Aloe are discussed, biological activity and the potential anti-cancer activity of the main, most active components of this plant are presented.

Alona PEREBYNOS, Tetyana KRYVOMAZ

Biological deterioration of wooden structures of the Bialystok Open-air Museum

The preliminary survey of the biodeterioration in the Bialystok open-air museum (Poland) shows that wooden buildings are in good condition and 92% of historical and architectural constructions were estimated to the second category of technical state. Buildings were examined to identify kinds of biological agents. The main biodeteriorations of wooden constructions were made by insects, lichens, algae films and colonies of microfungi. The comparison of the biodeterioration impact was made for the Bialystok open air museum and the skansen "Pyrogovo" (Ukraine). The probability of germination on the wooden structures of some species of fungi has been calculated taking into account the temperature conditions of the north-eastern region of Poland.

Olha SHEVCHUK, Oleksandr TKACHUK

Research of main analysis parameters of infiltration areas connecting to the storm drainage system

Infiltration areas with permeable pavements are one of the most effective modern methods of stormwater management on urban areas that permit accumulation of rainfall directly at place of precipitation. The paper justifies the expediency of inclusion of infiltration areas in the storm drainage system to ensure the effective stormwater management on urban areas. Thus, the aim of this paper is to calculate infiltration areas' basic parameters following the experimental and theoretical studies undertaken by authors. Based on these studies, a mathematical model of filling and emptying of base layer of infiltration areas by connecting them to the rain drainage systems is determined. As a result the formulae of calculation of the stormwater volume that detained on the infiltration areas, and the drainage discharges that came in the rain drainage system are received and verified. Moreover, obtained results permit to realize stormwater management on urban areas that depend on parameters of infiltration areas and pipe capacity of drainage system.