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Abstracts
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Vadim NIKITSIN, Beata BACKIEL–BRZOZOWSKA, Marta KOSIOR–KAZBERUK
Evaluation of concrete frost resistance on the basis of critical level of cumulated damages

Frost resistance of building materials is considered to be the main indicator of their durability. The analysis of degradation process of building materials subjected to cyclic freezing and thawing showed that the damages development in time runs according to two stages. The first stage is characterised by a slower damages accumulation process and a longer duration in comparison with the second stage. It was shown the time of passage the material degradation process from the first stage to the other one assigns the critical level of damages accumulation, which can be assumed for evaluation of material frost resistance. The methods to determine this criterion were proposed.

Barbara SADOWSKA-BURACZEWSKA, Magdalena PAZIK
The high strength concrete in the hybrid reinforced concrete members

The paper summaries the experimental of flexural capacity and deformability of structural concrete beams prepared as composite members consisting of two concrete layers made of reinforced normal concrete and high-strength concrete (HSC). The reinforced concrete composite beams used in the tests were prepared in modelling scale with the rectangular-section of 80 × 120 mm and the effective span of 1100 mm. The basic samples were composed in two layers consisting of high strength concrete as the top layer (C60/75 and C100/115), and normal strength concrete.

Aneta SIENKIEWICZ
Content of selected heavy metals in autogenic soils in the Supraśl and Dojlidy forest division in the Knyszyńska Forest

The paper presents the results of research concerning contents of the selected heavy metals (Cu, Co, Ni, Pb, Cr, Cd) in autogenic soils in the Supraśl and Dojlidy Forest Division in the Knyszyńska Forest. The aim of the studies was to determine the degree of soil pollution with heavy metals from communication. The research results show that the contents of the examined trace elements do not exceed the concentration limits for the soils of areas protected by law. The highest concentration in surface soil layer was found for copper, and the lowest for cadmium. Vegetation has a significant effect on reducing the heavy metal concentration, through increased assimilation by plants in a strongly acidic forest soils.

Justyna SIERGIEJUK, Andrzej GAJEWSKI
Choice of power source of heat between biofuel-fired boiler room and heat pump for terrace houses

In paper choice between biofuel and heat pumps as heat sources for terrace house was made. Calculations for heat demand equaling 148,97 kW were made. Geothermal heat pumps were matched and pellets were chosen as a biofuel. Afterward capital and working costs for analyzed heat sources were calculated. Results showed which of both heat sources is more cost-effective investment.

Robert STACHNIEWICZ
Methods of estimation of the effective thickness of insulating outer walls

The applied method of the judgement plays a vital role in case of the determination of effective thickness of thermal isolation. Simple methods (such as *SPBT - Simple Pay Back Time*) point at other effective thicknesses than the methods making use of the discount technique (for example *NPV – Net Present Value*). The effective thickness of thermal isolation calculated with the simple method (*SPBT*) will be different from the second one, calculated with the method *NPV*. It results from the fact that the calculations making use of the *SPBT* method include solely the period of the expenses refund. On the other hand the calculations making use of the discount technique involve the whole period of the investment duration. Additionally in the report the influence of five kinds of fuel on effective thickness of thermal insulation in the hypothetical cottage has been analysed. The effective thickness of thermal insulation was determined applying the criterion simple payback time *SPBT* and net present value *NPV*.

Tomasz Janusz TELESZEWSKI, Sławomir Adam SORKO

Implementation of the finite difference method with the Liebmann method for the solution of laminar flow through straight pipes

The work contains the implementation of the Finite Difference Method with the Liebmann Method for the solution of laminar flow through straight pipes using a two-dimensional grid. This method is the reduction of the three-dimensional grid to two-dimensional in the cross-section of duct. The algorithm were verified by numerical tests and compared with analytical solution. A numerical examples are presented.