

Abstracts Vol. 1 No. 2

Grzegorz BAŁ

Stress redistribution in result of opening executed in reinforced concrete beam

The paper deals with the manner of analyzing of stress redistribution effects caused by the made hole in the existing reinforced concrete beam. The analysis bases on determination of stress redistribution in the cross-section of the reinforced bar being under the phase of ideal plasticizing concrete in tension. It is indicated that making the hole generates additional a local self-balancing loads which must be take into account as the additional load of the weakened cross-section. A numerical approach to determining the states of stresses while propagating of the normal crack in the cross-section is proposed. This approach enables to catch the lack of local stability of loading process which makes the curvature essentially increases.

Anna DEMIANIUK, Katarzyna GŁADYSZEWSKA-FIEDORUK, Andrzej GAJEWSKI, Anna OŁÓW

The changes of carbon dioxide concentration in a cinema auditorium

Carbon dioxide is the fourth component in terms of the concentration in the air. The high concentration of CO₂ influences people in the negative way. Heat gains, air humidity and the concentrations of the airborne pollutants are taken into consideration during ventilation system designing process. In the indoor pollution balances the amount of the air, which is needed to remove the excess of the carbon dioxide is much lower than one in the case of the excess of the heat. The measurements of CO₂ concentration, humidity and temperature in the cinema projection room are presented in the work. The results are analyzed in relation to the acceptable indoor air quality, because the cinema auditorium is assumed to be an average indoor space.

Valeriy EZERSKIY, Małgorzata LELUSZ

Effect of cement type and antifreeze admixtures on compressive strength of mortars

The problem of conducting concrete works under conditions of low temperatures comes back together with winter. In the presented paper the results of laboratory investigation concerning the influence effect of selected antifreeze admixtures on compressive strength of the cement mortars curing in lower temperatures are presented. The test was conducted according to the principles of experiment planning. On the basis of the results a mathematical model was elaborated. The dependence of compressive strength of mortar samples was built as a function of some factors. These factors are X_1 the kind of antifreeze admixture, X_2 the amount of the antifreeze admixture, X_3 the cement type and X_4 the temperature of curing. The test results can provide the designers with the basic information concerning the possibility to continue building works in winter period.

Katarzyna GŁADYSZEWSKA-FIEDORUK

Concentration of carbon dioxide measured in university classrooms

Low concentration of carbon dioxide in the atmospheric air is considered to be a normal condition. Excessive concentration of CO₂ in the air may have negative influence on human's health. Permissible level of carbon dioxide concentration in didactic facilities as well as in all other closed spaces is 1000 ppm (WHO, 2000a), as devised by the WHO Regional Office for Europe. Two varieties of measurements were taken.

1. The level of CO₂ concentration was examined in classrooms in which different types of ventilation systems are used.
2. The efficiency of the ventilation system was measured on the basis of the parameters of the inside air; particular attention was paid to the level of CO₂ concentration.

Katarzyna GŁADYSZEWSKA-FIEDORUK, Andrzej GAJEWSKI

Measurements of the effectiveness of the ventilation system in an x-ray room in a county hospital

This study seeks to examine the effectiveness of mechanical ventilation systems in an X-ray room. The X-ray room is situated on the first floor of a hospital in a county town. The facilities have recently undergone thorough renovation and the

room was equipped with a modern X-ray apparatus. Also, a new ventilation system was installed. Both ventilation systems work independently. Supply and exhaust grilles are fitted into brick ducts. The air exchange rate for the exhausted air should amount to 1.5 h^{-1} , yet upon examination it turned out that the actual value was 1.34 h^{-1} . The incoming airflow is smaller than the amount of air drawn out of the room and amounts to 0.77 h^{-1} . The mechanical ventilation systems do not meet the required standards.

Wojciech GOSK

The bearing capacity of subsoil under continuous foundation based on Eurocode 7 and PN-81/B-03020

This paper presents results of calculations of bearing capacity of subsoil under the continuous foundation. These calculations were based on Eurocode 7 and Polish Standard PN-81/B-3020 (Building soils. Foundation bases. Static calculation and design). It was shown that calculated on the basis of these two documents bearing capacity of subsoil gives comparable results for characteristics values of geotechnical parameters. Calculations for design values of geotechnical parameters and loads give different values of bearing capacity of subsoil depending on applied design approach.

Marta KOSIOR-KAZBERUK

The resistance of concretes with fly ash from co-combustion of hard coal and biomass to chloride ion penetration

The practical utilization of new by-product of the power industry – the fly ash from the combustion of other fuels than coal – demands the assessment of its applicable properties. The paper deals with the research concerning the influence of the fly ash from co-combustion of hard coal and wood-biomass on the resistance of concrete to chloride ion penetration. The resistance of concrete was evaluated on the basis of the effective diffusivity coefficient determined in steady-state migration test. The investigations were carried out for concretes in which the part of Portland cement (from 0 to 25%) was replaced by the ash. On the basis of test results, it was found that the addition of the fly ash from the co-combustion caused the significant reduction of the concrete permeability for chlorides. The diffusivity decreased with the increase in percentage of ash in the concrete mixture as well as with the concrete age.

Dorota KRAWCZYK

The basic factors influencing energy consumption in offices

In those days the problem of Natural Environment Protection is getting stronger, mostly because of excessive using of Nonrenewable Energy Sources, mostly in emission of Carbon Dioxide, and other pollutions to atmosphere. In that reason it's necessary to qualify usage of energy in constructions. In this paper selected factors of energy consumption in offices are shown – in different bearings connected with the buildings structure and the inside installations – heating, ventilation, air conditioning, and lighting.

Janusz KRENTOWSKI, Romuald SZELĄG, Rościław TRIBIŁŁO

The features identification of steel roof structure loaded of fire temperature

Problem of exploitation of multifunctional sport building, using special and modern ventilation devices is presented in the paper. Unproper exploitation of modern ventilation devices was the main cause of fire and then damage of some structural parts of the multifunctional sport hall. Results of fire and rescue action according to structural elements was presented. The reinforcement way of the structural elements and conditions for safe exploitation recapitulated the paper.

Janusz KRENTOWSKI, Rościław TRIBIŁŁO

The danger condition of outer layer walls. Prototype solutions

The problems connected with durability decreasing of outer layer walls in living buildings were presented. The degradation of steel elements connecting wall concrete layers causes danger in exploitation. The conceptions of modernizing works which make it possible to reinforce connections and safety exploit buildings were presented. The conclusion of the work indicate the practical aspect of diagnostics solution of layer outer walls in exploited buildings.

Jarosław MALESZA

Identyfification of supporting moment in semi-fixed beam

Paper presents procedure of supporting moment identification in the statically indeterminate, partly fixed reinforced concrete beam. Examined beam is a part of reinforced concrete frame, where rate of fixing is subjected variation under influence of continually increasing loading. Bending moment at the fixing end remains the unknown internal force in the beam. This unknown is determined on the basis of identification of theoretical and experimentally measured deflections in the selected sections of element. Theoretical deflections are computed numerically integrated curvature equation of the beam axis under assumption that effects of physical nonlinearity of reinforced concrete reveal in the process of loading. These effects describe quantitatively the Murashev theory of stiffness changes. Boundary problem of partly fixed beam is solved applying iterative procedure characteristic the initial problem applying integration schema ahead with increased accuracy.

Vadim NIKITSIN, Beata BACKIEL-BRZOZOWSKA

Evaluation of the ability of calcium-silicate goods to resist water penetration

The evaluation of the water penetration resistance coefficient M and the porous equivalent radius r_e is proposed in this work to evaluate water penetration resistance in calcium-silicate material. The method of these parameters evaluation was described, based on the results of capillary pooling test. The specimens were prepared out of calcium-silicate goods from three manufacturing enterprises. The statistical analysis of the effect of three technological factors on the value of the water penetration coefficient M was also conducted. Moreover, it was shown that the mercury porosimetry data must not be used to evaluate water penetration coefficient M . Procedure of calculation of the mean conditional radius of capillary considering its tortuosity was also described.

Paweł SZKLENNIK

Numerical analysis of the boundary loaded bar in the approach of wave mechanics and dynamics

In the paper solutions of a bar loaded instantly with the lengthwise force are presented. The results were obtained using the consistent for space and time difference method. The problem was solved in the accordance with the approaches for both wave mechanics and dynamics in order to illustrate the differences between these solutions. The integration of the equation of dynamic equilibrium, identical in both formulations, was performed using various time integration schemes. The explicit, implicit and the θ -Wilson schemes were analysed. The explicit scheme enables an accurate description of the stress wave propagation and the effects of the wave reflection on fixed and free edge. The implicit scheme enables an appropriate description of dynamic bar behavior but in the longer time period it generates significant effects of spurious damping. The θ -Wilson scheme correctly presents the form of the bar's wave reaction but the fronts of the stress waves are dispersed in comparison to the explicit method.