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Internal stability of geosynthetic -reinforced soil retaining walls

This paper presents a design methodology in accordance with Eurocode 7 and EBGEO's recommendations when analysing the internal stability of geosynthetic-reinforced soil retaining walls. Every step was thoroughly presented, considering the example as very helpful in designing such retaining constructions by engineers. The calculation were carried out with the use of classical method and GEO5 software. It was shown that the application of EBGEO calculation methodology and GEO5 programme methodology lead to similar levels of the retaining wall's safety. GEO5 programme can be successfully used for designing the geosynthetic-reinforced retaining walls..

Artur DUCHACZEK

Analysis of influence of cross-beam sizes and methods for their mounting on maximum value of stresses in main girders of low-water bridges

The military low-water bridges are engineering objects designed for short term use. This type of construction solutions also appear in civil engineering. However, in the professional literature there are not any guidelines how to design crossbeam made of the steel beams. In this paper the impact of the crossbeams rigidity and their connections on the stress distribution in the major girders of military low-water bridges was analysed. Based on conducted calculations, it was found that in the case main girders made of steel I-beams (height 400 mm), provided that their spacing did not exceed a distance of 0.80 m, the application of the cross-beams made of steel sections with a height similar to the half the height of the main girder was sufficient.

Ryszard Marian JANKA

Impact of thermomodernisation errors of public buildings on the level of indoor air quality

Renovation of public buildings, especially historic buildings, should ensure not only improve their condition and reduce the energy consumption, but also the appropriate level of indoor air quality. Inserting in the hallways of public buildings fire partitions without at the same time ensuring an adequate level of air exchange affects the deterioration of indoor air quality at these facilities. They arise areas where there is inadequate quality of indoor air. Air that they breathe, both employees of the institution taking up very often important decisions and the clients of these offices. The article presents a study on the impact of the scope of the modernization of selected public facilities, passenger load, the residence time of the meeting room and the volume and the type of ventilation system on the course and speed of changes in the concentration of carbon dioxide in the indoor air. These studies were conducted in eight areas both administrative and auditoriums of different sizes and purposes in two renovated nineteenth century public buildings. These buildings are the seats of the courts. This issue is related to research changes in humidity and air temperature. It has been shown that under high load passenger rooms after about 40-50 minutes up to 1.5 hours in the indoor air concentration of carbon dioxide is over two and three times higher than the threshold level of the sanitary CO₂.

Walery JEZERSKI, Joanna BOROWSKA

Is that a real optimalisation of window parameters?

Every residential building has windows, however they are the weakest elements in terms of thermal insulation. It is constantly strived to ensure that the heat balance for the woodwork was comparable to that of the walls, while meeting the necessary requirements. In the paper, attempts to optimize the parameters of window woodwork, described previously in specialist articles, were characterised, as well as the analysis and evaluations of whether, in reality they are an example of the optimalisation. There were also given indicators, which clearly control the parameters of the windows.

Magdalena JOKA, Ewa SZATYŁOWICZ, Piotr OFMAN

Assessment of heavy metal content in products of methane fermentation of agricultural biogas plant "Ryboły"

The aim of the study was to determine the content of the general forms of heavy metals (inhibitors of methane fermentation process) in the products and intermediates products of methane fermentation of agricultural biogas plant placed in Ryboły village. The research includes the analysis of the presence in biogas plant feed general forms of metals (Ca, Mg, Cd, Cu, Pb, Zn). Material was taken from the first (pre-fermentation) and second fermentation tank and from the vessel digestate. Received high levels of general forms of calcium and magnesium in the tested materials can be caused by using too much poultry manure feed. Furthermore, it was observed that the increase in the content of the general form of the analyzed elements is caused by a reduction in the concentration of the organic dry, used for the production of biogas.

Sławomir ROJ-ROJEWSKI, Olgierd ALEKSANDROWICZ

Compatibility of measurements of automatic weather stations located on the roofs of buildings and measurements of the IMGW-PIB station

In the study data from two stations mounted on roofs of buildings at the Białystok University of Technology and the University of Białystok, and one station IMGW-PIB located in a slight distance from each other, were compared. Statistical analyses concerned 18 full months (16 for wind direction) from October 2011 until May 2014. Measurements carried out by automatic weather stations mounted on the roofs of buildings often differ in relation to the measurement of meteorological service for short-term, such as daily. Differences in measurement methodology are the most visible for that period, particularly regarding the relative humidity and wind direction. Some weather stations can provide daily air temperature and precipitation comparable to professional ones. The differences between the measurements are blurred when comparing monthly data. Air temperature, wind speed and precipitation for longer periods do not differ in a statistically significant way in relation to the measurement meteorological network, so they can be used for similar purposes. Significant differences were observed only in case of relative humidity and wind direction.

Daniel PRZYWARA, Adam RAK

Radiocarbon ¹⁴C method as useful tool for flue gas monitoring application: review

Cosmic-ray research which started just after the second world war in 1947, encouraged widespread use of radioactive particles in many areas of science and technology, starting from astronomy, chemistry, archaeology, biology, botany, medicine and lately ending with environmental studies. Method based on measurements of the radioactive elements remains in various samples (solid, liquid and gaseous) can be very useful tool for ecological and environmental analytical measurements. The ¹⁴C liquid scintillating counting method was used for simplified determination of the biomass content in flue gas from combustion processes or in the finished bio-product. Review of the latest results and progress in this research area shows the growth of interest from industrial sector in normalised method for biomass content determination.

Zenon SZYPCIO, Katarzyna DOŁŻYK-SZYPCIO

External stability of geosynthetic -reinforced soil retaining walls

This paper presents the problems of external stability of reinforced soil retaining walls. Special attention was paid to earth pressure on the reinforced soil retaining wall, homogenization of the subsoil and the influence of changes in the groundwater level on the wall's stability. The external stability analysis of an exemplary wall from reinforced soil was carried out in accordance with Eurocode 7 using the classical method incorporating elements of GEO5 software. Bearing capacity of subsoil depends on the homogenization method and significantly drops at the increasing level of groundwater table.