

Stanisław Barycz, Karol Firek, Wojciech Kocot: **The Role of Testing Technical Features of Concrete to Assess the Predicted Durability of Massive Reinforced Concrete Structures Illustrated with an Example of Set Foundations** • Geomatics and Environmental Engineering 2015, Vol. 9, No. 3

This article presents the tests, conducted in the years 1995-1996, of the technical condition of reinforced concrete bottom plates of turbine unit foundations, which were about 35 years old at that time. Based on the strength tests of concrete cores cut out from the foundation slabs, as well as sclerometric non-destructive testing, it was found that the compressive strength of the concrete corresponds to classes C16/20 and C20/25, which were required for this type of structure. The results of physico-chemical studies confirmed that for the conditions in which these two bottom plates were placed in (with appropriate waterproof insulation), their durability was not compromised. The presented results of the research formed the basis for a decision to use both foundations as supports for the framework structure for new turbine sets, thus allowing for further 40 years of their utilization. Now, after nearly 20 years of use, they show no signs of wear and properly perform their role. The current technical condition of the turbine set foundations confirms that the decision made in the mid-90s was the right one, and the scope of the research which was then carried out can serve as an example of the course of action adopted for similar cases.

Keywords: structure durability, foundations for machinery, concrete testing

Karol Firek, Anna Kulpa: **The Issues on Site Surveying during the Construction of a Bridge Span with the Cantilever Method** • Geomatics and Environmental Engineering 2015, Vol. 9, No. 3

This article presents an analysis of surveying methods employed during the construction of a bridge span erected using the cantilever method. With this specific technique used for construction of a structure, a complex geodetic coordination of

scaffolding trolley and formwork assembly for consecutive segments of the span is required. This work was prepared based on the surveys conducted during the construction of a bridge across the Wisłoka river in Łabuzie, implemented as part of the modernization of the national road No. 4 between Machowa and Łańcut.

Keywords: bridge span construction site surveying, cantilever technique

Mateusz Ilba: **An Analysis and 3D Visualization of Shading of Urban Spatial Objects with the Use of the Python Programming Language in the Blender Application** • Geomatics and Environmental Engineering 2015, Vol. 9, No. 3

Shading analysis has been performed for several years. It is commonly performed on the basis of raster data with saved height attributes. An undoubted advantage of the application of raster is the speed and the easiness of the analysis but this solution has also many limitations. One of them is the impossibility of executing a correct analysis for a 3D city. The analysis performed only on raster data cannot answer the question, what happens to vertical elements of buildings and yet surfaces of these elements (walls) are far greater in big cities than horizontal and oblique ones, which we are able to save as raster images [11]. It is only recently that the tools are available, which make it possible to analyze the shading on 3D models. However, such tools have a lot disadvantages; they are expensive and have some limitations. On the example of the ArcGIS application, the following limitations can be enumerated: difficulties, while determining shadowed surfaces together with their classification; in the case of the Bentley Microstation V8i application, there is no influence on the output classification; the access to the generated data is carried out by displaying results. Additional software for these applications is created but it is payable and also does not give 100% control over the presentation of results. It is in this article that we will take a closer look at the feasibility of an analysis of shading of high urban buildings and its visualization using an algorithm for ray tracing that is available in the Blender application available under the GPL license. The author tested the work of the application on an example of an artificially built part of a 3D city and on a part of New York.

Keywords: analysis of shading, 3D city, Blender, 3D visualization, GIS

Ivan Merdukh: **The Electromagnetic-Field Effect of Industrial Origin on the Cardio-Vascular System of Urban Land Inhabitants (Illustrated with an Example of Ivano-Frankivsk City, Ukraine)** • Geomatics and Environmental Engineering 2015, Vol. 9, No. 3

The level increase of comfort of the people in the urban social ecosystems has led to becoming a greater number of factors that may affect on the balance of the system “society-natural environment” and, consequently, on the people health. Among them the special place takes the influence of the electromagnetic radiation (EMR) on the human body. At each point of the test area the intensity of the electric field (E), the intensity of the magnetic field (H) and the intensity of the surface density of energy flow (μ) were measured. For the measurements were used tester Tenmars RF three-Axis Field Strength Meter TM-195. For the medical and environmental research at selected points of test area of urban area of Ivano-Frankivsk city at one time with intensity measurements of electric field (E), magnetic field (H) and the surface density of energy flow (μ) conducted measurements of heart rate (HR), systolic arterial pressure (S) and diastolic arterial pressure (D).

Keywords: urban social ecosystem, radiation, heart rate, balance, magnetic field

Radosław Piskorski, Ewelina Czernomysa: **Building Change Detection from Multitemporal Airborne Lidar Data Based on Morphology and Histogram** • Geomatics and Environmental Engineering 2015, Vol. 9, No. 3

This publication provides an overview of methods that use multitemporal ALS data for the purpose of detecting changes in the building. Based on the proposed two-step solutions applied method based on the use of morphological filters and the analysis of the histogram. The proposed method has been tested on seven areas with different types of buildings. Morphological operators are used to detect the state of buildings in the studied period (2006 and 2012). On the basis of the substitution obtained maps, it obtained results showing the locations of the changes. After eliminating artifacts, presents an analysis of the accuracy characterized correctness building detection and detection of changes. In order to more precisely characterize the changes which are occurred, uses histograms created based on the elevation data. On the basis of their requested on the type of changes that have taken place in the area.

Keywords: Airborne Laser Scanning (ALS), morphological operators, histogram, building change detection

Kornilyi Tretyak, Petro Dvulit, Lyubov Babiy: **About Accuracy of Calculating Deviations of Plumbing Lines in the Region of International Research Geodetic Polygon of the Western Alps** • Geomatics and Environmental Engineering 2015, Vol. 9, No. 3

This work is generalization of some methods for calculating deviations of plumbing lines from a perspective of accuracy of their values calculation and possibilities to use high accuracy models of geopotential for calculating deviations of plumbing lines. There was done attempt to determine the order of the value of the first corrections of Molodensky into Stoke approximation of quasigeoid heights and deviations of plumbing lines in the mountain region of the International research geodetic testing area in the region of Western Alps. Established discrepancies between true and calculated components of plumbing line deviations can mainly be explained by errors of astronomic determinations as components of plumbing line deviations includes influence of the zeroth and first approximation of field of anomalies. Differences between model and true components of plumbing line deviations can be explained by not considered influence of central and close zone of anomaly field.

Keywords: anomaly of gravitational acceleration, astronomical-geodetic and gravimetric components of deviations of plumbing lines, first corrections of Molodensky, point of International research geodetic polygon of Western Alps

Grażyna Wójcik, Przemysław Leń: **Spatial Development of Agricultural Land Division throughout the Ages in Villages of the Opoczno County** • Geomatics and Environmental Engineering 2015, Vol. 9, No. 3

The spatial structure of lands in rural areas evolves as a result of an extremely complex process influenced by a diversity of interrelated phenomena. The division of the rural areas was and still is greatly impacted by the form of land ownership. This in turn depends on a number of factors. Population density is the primary factor contributing to the changes in the spatial structure of land in the countryside; it is closely related to factors linked with the natural environment as well as structure of economy and production. The present article presents spatial development of agricultural land division in villages of the Opoczno County. The authors will attempt to identify factors which have impacted the present spatial structure of the investigated rural areas.

Keywords: land division, land fragmentation, land layout, land consolidation