

## STRESZCZENIA

**Kamila BOGUSZEWSKA<sup>1</sup>**

### **SELECTED RESIDENCES IN THE ZAMOŚĆ ENTAIL – THE STATE OF PRESERVATION AND THE PROBLEMS OF PROTECTION OF THE ESTATES**

The cultural landscape of the Lubelskie Region is a subject to irreversible changes. Urban transformation of the structure and architecture of the cities of the Lubelskie Region, the new character and organization of urban space, changes in ownership and subdivision of historical residences including historical parks, palaces and manors are the processes that take place in the space and landscape of the Lublin Voivodeship. The research paper concerns the area of the former Zamość Entail (the Zamoyski Family Fee Tail), which was founded in the Lublin area as early as in 16<sup>th</sup> century. The article presents the results of the survey of the architecture of the selected residences and their surrounding buildings. It focuses on the subject of protection and current state of preservation of the estates that constitute the cultural heritage of the Zamość Region.

**Keywords:** historical residences, Lublin region, cultural heritage

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### **ANAEROBIC OXIDATION OF METHANE IN FRESHWATER ECOSYSTEMS**

Anaerobic oxidation of methane (AOM) is a biochemical process that plays an important role in aquatic ecosystems, as it significantly reduces the emission of methane (CH<sub>4</sub>) to the atmosphere. Under anaerobic conditions, CH<sub>4</sub> can be oxidized with electron acceptors, such as sulphates (SO<sub>4</sub><sup>2-</sup>), nitrates (NO<sub>3</sub><sup>-</sup>) or nitrites (NO<sub>2</sub><sup>-</sup>), iron (Fe<sup>3+</sup>), manganese (Mn<sup>4+</sup>) and humic substances. The anaerobic oxidation of methane is mainly regulated by anaerobic methanotrophic archaea (ANME) and sulphate reducing bacteria. The AOM process is crucial to understand the CH<sub>4</sub> cycle and anticipate future emissions of the gas from water reservoirs. The process is widely described in marine environments, however very little is known about its occurrence and importance in freshwater systems. There is a great demand for this kind of the research, especially in ecosystems exposed to long-term anaerobic conditions, which may be in degraded reservoirs.

**Keywords:** anaerobic oxidation of methane, electron acceptors, methanotrophic archaea

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## **DISSOLVED ORGANIC CARBON AND BIODEGRADABLE DISSOLVED ORGANIC CARBON DETERMINATION IN RIVER WATER OF THE STRUG BASIN**

The aim of the study was to determine Dissolved Organic Carbon (DOC) and Biodegradable Dissolved Organic Carbon (BDOC) concentrations, as well as the correlation between them, in the river water of the Strug basin located in the Carpathian Foothills. The Strug river's hydrographic basin was chosen for the study as it is a typical catchment area, which allows ease of measurement. DOC concentrations in the streams (tributaries) and the Strug ranged from 2.71 to 4.88 mgC/dm<sup>3</sup> and from 3.62 to 4.19 mgC/dm<sup>3</sup>, respectively. BDOC concentrations in the streams and the Strug ranged from 0.40 to 1.09 mgC/dm<sup>3</sup> and from 0.64 to 0.77 mgC/dm<sup>3</sup>, respectively. BDOC, expressed as the percentage of DOC (%BDOC) ranged from 14.76 to 24.78% in the streams, and from 17.68 to 20.11% in the Strug. The percentage of BDOC is independent of DOC concentrations. The season of the year and the size of the watercourse had the greatest impact on DOC and BDOC concentrations.

**Keywords:** organic carbon, water quality, natural waters, water protection

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## **COMPUTER SIMULATION OF HEATING PROPERTIES IN WALL PARTITION WITH BUILT-IN ELEMENTS THAT IMITATE THERMAL BRIDGES**

The article aimed at presenting of the design assumptions of the wall partition built and results of computer simulation of thermal properties in a heterogeneous wall partition in THERM. Display of the isotherms' distribution, heat flux vectors and temperature distribution in the area of thermal bridges and beyond. The tested partition on the basis of which simulations were

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created, was equipped with elements imitating thermal bridges, used in construction, to show their influence on the thermal properties of building structures. Thermal bridges can take the form of linear and point bridges. The example described in the article concerns the problem of thermal bridges occurring in wall partitions. The simulation is a preliminary pilot action before the start of non-invasive tests, ie measurement and calculation of the heat transfer coefficient, thermovision measurements on the surface of the barrier.

**Keywords:** 2D modeling, thermal permeability, thermal flows, point and linear thermal bridges

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## **THE IMPACT OF WIND FARMS ON ACTIVE POWER LOSSES IN THE POWER SYSTEM**

Increasing emission standards and European Union policy require investment in the renewable energy sector. An increasing amount of renewable energy sources, including wind farms, requires changes in the power system in countries whose energy is based on large system power plants, mostly coal-fired. Stricter share of renewable energy sources in energy mix, may improve the country's security and ensure the diversification of fuels and the gradual independence of conventional fuels. Thanks to regulation possibilities of doubly-fed induction generators, which are equipped with a significant part of wind turbines, it is possible to obtain better electricity parameters. The location of energy sources near the receiving nodes has a positive effect on the active power losses in the power system. This article analyzes the impact of a 30 MW wind farm on the level of active power losses in the power system, taking into account the different power factor values with which the wind farm can work. Simulation were carried out using the Powerworld Simulation software.

**Keywords:** wind farm, power system, active power losses

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## **DEVELOPMENT OF SMALL-SCALE LOW-COST METHODS OF DRYING HERBS AND AGRICULTURAL PRODUCTS**

Herbs are characterised by different contents of biologically active substances, hence they are widely used in various branches of industry. Herb cultivation in East-Central Europe focuses on small-sized areas requiring machines and equipment adapted to the scale of production. The processing of herb plants involves drying, which is one of the most important stages of herb preservation, conditioning the right quality of the raw material. This article presents a short description of the methods for herb preservation and a classification of drying systems using solar energy and hot air. Looking for ways to assure the drying of the crops in unfavourable atmospheric conditions, variants of solar collectors with the biomass-powered furnace for heating drying air in driers of herbs have been invented. The solutions developed by authors of this paper to provide small-scale low-cost technological devices for the drying of herbs and specialty crops are also presented. The installations presented use hot air from solar radiation and heat generated from the combustion of biomass in the form of wood chips. These installations and equipment do not require an electricity supply. The elimination of natural drying through the use of drying chambers eliminates the unfavourable effect of ultraviolet radiation on the loss of essential oils. The drying installations and devices presented in this article are under patenting procedure.

**Keywords:** drying, drying chamber, herbs, herbs cultivation, solar collector, spices, wood chip burner

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