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Editorial

Advances in Environmental Engineering

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Environmental quality is crucial to our health, our economy, and our lives. However, it faces several serious challenges, not least those of climate change, unsustainable consumption, and production, as well as various forms of pollution. This Special Issue collects research papers aimed at a wide range of environmental topics: water and wastewater treatment and management, soil degradation and conservation, sediment pollution control, the environmental impact of technologies, life cycle analysis (LCA), air quality and indoor environment, and advanced environmental materials. Contributions describe novel and significant knowledge, scientific results, and advanced applications in the field of environmental engineering. This Special Issue provides an integrated view of the trends in solving the problems associated with the achievement of sustainability in environmental engineering. This issue contains twelve papers that have been selected as emerging studies dealing with the above-mentioned topics.

The contributions, aimed at wastewater treatment, present a wide range of methods applied to various pollution removal methods. Investigating contaminants of emerging concern such as pharmaceuticals and personal care products reveals that the fate of these compounds in the aquatic environment has been a topic of wide interest and active research. Lecours et al. [1] applied different electrochemical approaches to the study of the oxidation products of the anti-infective trimethoprim, a contaminant of emerging concern frequently reported in wastewaters and surface waters. The authors found that electrochemical techniques are relevant not only to mimicking specific biotransformation reactions of organic contaminants but also to studying the oxidation reactions of organic contaminants of interest in water treatment.

Tian et al. [2] investigated the effects of physico-chemical post-treatments of sewage sludge using ultrasonic, ultrasonic-ozone, and ultrasonic+alkaline methods. The results showed that the post-treatments were able to increase biogas production and decrease the amount of volatile solids in the final effluent.

In the work by Pipiska et al. [3], the biosorption methods for pollution removal from wastewater were studied. Dried biomass of freshwater moss *V. dubyana* has been used as biosorbent for cationic dyes methylene blue and thioflavin T removal from both single and binary systems. Influence of a contact time, pH, and sorbate concentration on the dyes' removal efficiency has been investigated. The authors reported that an increase in pH has a positive effect on both thioflavin T and methylene blue sorption, and dye removal by moss *V. dubyana* is likely based on the electrostatic attraction.

Another paper [4], dealing with wastewater treatment, studied and quantified the elimination of sunflower oil from wastewater influent using a biological treatment involving activated sludge. The findings revealed that the efficiency of the elimination of sunflower oil using a combination of biodegradation and flotation was 90%.

The next two papers deal with soil properties and sediment modelling. Gomboš et al. studied the selected parameters of soils for further numerical simulation of the water regime and its prognosis under heavy soil conditions. Soil profiles were evaluated for the distribution of volume changes to the

horizontal and vertical components. The effect of texture on geometric factor values was analysed. A close correlation between the measured horizontal volume changes and the geometric factor value has been found [5].

Junakova et al. focused on the design of the mathematical model that was intended to predict the total content of nitrogen, phosphorus, and potassium in bottom sediments in small water reservoirs depending on water erosion processes. The proposed model was validated in the small agricultural watershed of the Tisovec River, Slovakia. The results indicate the applicability of the new model in predicting the quality of the reservoir's sediment detached through erosion processes in the watershed [6].

The environmental impact of various technologies has been assessed in the next three papers. The paper [7] deals with the life cycle assessment of electricity generation from various energy sources in the Czech Republic. The greenhouse gas emissions were chosen as key indicators to evaluate the environmental load of particular energy sources. The obtained results revealed that the worst environmental impact in terms of greenhouse gas emissions is linked to electricity generation based on lignite.

Zeleňáková et al. [8] reported on the environmental impact of a small hydro power plant including the selection of the optimal alternative of the assessed construction and proposed measurements to reduce the negative impact. Their paper points to the importance of assessing the impact of construction on the environment in the early planning phase. Eliminating the negative environmental impact of construction in the early phase of design is much more challenging than the implementation of measures in the construction or operation phases.

The variant solutions of a selected heating system were analysed by Ondrejka Harbulakova et al. [9] using methods of the environmental impact assessment (EIA). Multi-criteria analysis proved that the construction of the biomass-fired power plant was the most suitable solution among three assessed variants (zero alternative, biomass power plant, and modernized gas boiler).

A significant negative impact on human health and the quality of life of millions of people worldwide is associated with urban air pollution. Tsai [10] presents an overview of the Taiwan's air quality with a special regard to the indoor air. The paper points to the importance of using green building materials in terms of the low emission of volatile organic compounds (VOCs) and other air toxics occurring indoors. The author highlights Taiwan's efforts to indoor air quality improvement through legal systems and promotion measures, which are relevant to the contribution to the quality and sustainability of the environment.

Other dangerous pollutants in the air are particulate matters of various origins. Road traffic emissions caused by both exhaust and non-exhaust sources contribute significantly to the particulate matter (PM) concentration in an urban atmosphere. Penkała et al. [11] reported that direct road-surface abrasion is of minor importance when the road is undamaged. However, the paper analyses the impact of abrasion emission reflecting realistic conditions, analysing how such emission changes, both quantitatively and qualitatively, the character of PM near roads.

With the development of new urban areas, there is a great challenge in finding new materials with an environmental added value. Pervious concrete can be an environmental solution for managing storm-water runoff. Kovac et al. [12] presented an alternative method for storm-water control using porous pavements. This paper presents the results of experimental work aimed at testing technically important properties of pervious concrete prepared with three different water-to-cement ratios. The results show that a decrease in water-to-cement ratio caused only slight differences in strength characteristics.

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