



Editorial

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The present worldwide annual municipal solid waste (MSW) production is around 2.01 billion tons and, this sector is the third-largest contributor to the global anthropogenic methane emissions amounting to 11% of the total methane emissions. Sanitary landfilling is the preferred option and if the management of waste collection, segregation, and disposal systems is not satisfactory, it results in waste dumps. In this special issue, we present a series of interesting reviews that cover the latest research trends and developments in the area of landfills and in the sustainable use/development of landfills and dumpsites.

The article by Donevska et al. paper presents a comprehensive review of the methodological frameworks and criteria used for municipal solid waste landfill selection. The review is based on 89 scientific papers published in peer reviewed journals. The evaluation of the landfill siting criteria indicate that the main criterion is environmental, followed by economic and social criteria, while the most preferred sub-criteria is distance to the surface waters. These findings and classifications are beneficial to the researchers and decision makers, and serve as a support to the complex and difficult process of landfill site selection in practice.

Jyoti and Reddy present a comprehensive review on Municipal Solid Waste Landfill Cover Systems, along with the cover design criteria, core mechanisms underlying their function, regulatory requirements, advancements in the alternative cover systems, including their advantages are discussed. The research challenges/opportunities in the field of exploring alternate landfill cover systems are also discussed.

Bouazza and Zhang studied the variations of the temperatures of a black high-density polyethylene (HDPE) geomembrane (GMB) liner in a municipal solid waste landfill for over seven years. They noted that a white geotextile cushion did not insulate the geomembrane from solar radiation, which still experienced elevated temperatures and the placement of the drainage layer reduced the impact of solar radiation on the GMB and insulated it.

Katsumi et al. present a few selected geotechnical and geoenvironmental aspects of landfills in Japan and covered aspects such as generation of waste, current status, national policy, classification of waste landfills, coastal landfills, geotechnical and geoenvironmental challenges in coastal landfills etc. They also presented a new containment system with thick soil cover system to enhance abolition of landfill sites.

Chen et al. cover geoenvironmental issues in high-food-waste-content municipal solid waste landfills in China. According to them major cause of geoenvironmental issues in high-food-waste-content landfills are rapid leachate and landfill gas generation. They presented a practical model for analyzing leachates and gas production and case of landfills in China were used as an example to describe engineering measures for leachate drainage and landfill gas collection.

Mohan and Joseph discuss the state of landfill practice in India. The study gives the data regarding waste generation in different states, highlights the issues with open dumping, and a few methods which can be effectively used to treat solid waste are enumerated.

Hettiaratchi et al. proposed many innovative practices to maximize resource recovery and minimize Greenhouse Gas Emissions from Landfill Waste Cells. They presented the details of landfill bioreactor concepts, effects of leachate recirculation, enhancing gas generation, minimization of fugitive methane emissions during cell filling and before cell closure, landfill cell mining and resource recovery, quality of recovered material and end use as value-added products etc.

Sughosh and Sivakumar Babu highlight the role of bioreactor landfill concept in waste management in India. A review of the bioreactor landfills, landfill mining, and biocover systems are presented. Laboratory scale bioreactor studies on the degradation of mechanically and biologically treated waste of Bangalore city under anaerobic, aerobic, and semi-aerobic conditions are presented. They indicated that application of bioreactor landfills concept for remediating existing

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MSW dumpsites can reduce the environmental impact significantly.

Manheim et al. discussed the impact of gas emissions from municipal solid waste landfills and conducted a comprehensive review and analysis of global data in their paper. The results of review are useful to verify initial estimates of national inventory models and as baseline data to inform future strategies focused on managing global greenhouse gas and NMVOC emissions from MSW landfills.

Fang et al. present a review of the various types of techniques used to treat landfill leachate/leachate concentrate, including advanced oxidation process (AOP), membrane bioreactor, denitrification, biofilm reactors, and electrocoagulation. The occurrence and treatment of emerging contaminants in landfill leachate, and opportunities for development are also considered. The review covers the basic principles through to the latest developments in research, including the effectiveness of engineering applications, their economic

and technical challenges, together with current gaps in the knowledge and the prospects for leachate treatment.

The issue in summary is a very comprehensive collection of reviews in the area of landfills addressing landfill siting location, landfill liner issues, landfill covers, use of bioreactor technology for landfills, practices and regulations in Japan, India and other countries, dump rehabilitation, impact of gaseous emissions and leachate treatment.

The editors thank the authors for the valuable contributions to this special issue on landfills.

Best wishes,
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