

Special Issue on Issues and Challenges in Geoenvironmental Engineering

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The special issue on *Issues and challenges in geoenvironmental engineering* covers a number of technical papers that address several emerging issues such as landfill design, remediation of waste dumps, and site remediation techniques. The paper by Santhosh et al. presents results of laboratory investigation of large scale MSW reactor under anaerobic conditions which provide insight into the variation of moisture content, pH, temperature, settlement, and quantity of leachate as well as landfill gas with respect to the simulation of measured quantity of rainfall during the experimental study which are useful in understanding the complex mechanisms to design and for the effective operation of landfills for the sustainable waste management. The paper by Datta and Kumar on the assessment of subsurface contamination potential of municipal solid waste (MSW) dumps presents a newly developed simplified system to assess the relative potential of subsurface contamination of such MSW dumps. The study demonstrates that the new simplified system performs better than DRASTIC in terms of sensitivity and range of rating scores. Kurup et al. presented a review of current and emerging technologies for site characterization with a specific focus on in situ detection of heavy metal contamination in geoenvironmental remediation projects. In addition, on-going research performed for the development

of an in situ voltammetric sensor system is presented. Meegoda presented a detailed laboratory scale feasibility study of recovering metallic iron and chromium from chromium contaminated Soils. The information provided on reduction at high temperature should prove useful in providing background information in thermal treatment and also the potential recycling of metal from contaminated soils.

Yang et al. studied the effect of phosphate dispersant amendment on workability of Ca-bentonite slurry for slurry trench cutoff-wall construction and show that it enhances the workability of the Ca-bentonite slurry for use during the construction of soil-bentonite cutoff walls. Reddy et al. studied the suitability of nine native restoration plant species for phytoremediation of polycyclic aromatic hydrocarbons (PAHs) and heavy metals in upland area of Big Marsh site (Chicago, IL, USA) and showed that the results have considerable promise.

Sreedharan and Sivapullaiah studied the hydraulic performance of organo clay enhanced sand bentonite as secondary liner. The results point out that the both single chain and double chain long chain quaternary ammonium compounds can successfully be employed for organic modification of Kutch bentonite.

Das and Bharat studied the effect of counter ions on the diffusion characteristics of a compacted bentonite. The effect of hydrated size and valence of the cations on the mass transport parameters of the bentonite was qualitatively analyzed using diffuse double layer theory. The significance of the variation in mass transport parameters was analyzed using the simulated concentration profiles along the depth of the clay liner.

Rathod and Sivapullaiah studied the migration of sulphate under different conditions using electro-kinetics as

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remediation technique. From the study, the breakthrough time of sulphate under electrical gradient was observed to be less compare to column test in spite of electro-osmotic flow occurring in the opposite direction and the effective diffusion coefficient of sulphate under electrical potential was found to be significantly high compare to column test but lower than the values generally reported in literature.

Rao and Acharya performed mercury intrusion porosimetry studies with geopolymers. The experimental results indicated that geopolymers with larger air voids and macro pores volume exhibited superior compressive strength; the results imply that geopolymers which develop an open microstructure during polymerization are characterized by larger compressive strength, possibly from stronger bond formation in the silico aluminate structure. Jha and Sivapullaiah presented a review of behaviour of gypseous/gypsiferous soil and presented different methods available for stabilizing the soil containing gypsum.

Jaskiran Sobti and Sanjay Kumar Singh studied the effects of hydraulic conductivity and matric suction in sand–bentonite–coal ash mixes and showed that that the addition of high percentages of bentonite and coal ash to the soil lead to higher suction pressures.

Hossein Soltani-Jigheh and Ashkan Azarnia present studies on the effect of liquid polymer and lime additives

on the behavior of fine-grained soil at unfrozen and freeze–thaw conditions. Results show that results of strength improvement or reduction are affected by conditions as well as additives.

Tummala et al present the use of solid wastes as cushion material to prevent swell potential of expansive soils. They used ground granulated blast furnace slag (GGBS) from steel industry, dust from quarrying industry, along with addition of some amount of lime to prepare cushion material in controlling the heave of expansive soils and their potential to counteract the damage caused by wetting and drying cycles.

Guruprasad Hugar studied the effect of soil organic carbon on perviousness and conservation property of soil and showed that fly ash for BC soil, bagasse ash for red, marshy and mountainous soil were found to be the best suited soil-amendment combinations in enhancing the property of soil conservation and perviousness.

In general, papers presented in the special issue present comprehensive work on some of the geoenvironmental challenges and attempt to present solutions and interesting approaches as well. It is hoped that the papers presented in the special issue are useful to the researchers, academicians and professionals working in the area of geoenvironmental engineering.