Landfill Leachate Treatment Using Sequencing Batch Reactor Process Improvement Of Sbr Performance

As the world’s population continues to grow and economic conditions continue to improve, more solid and liquid waste is being generated by society. Improper disposal methods can not only lead to harmful environmental impacts but can also negatively affect human health. To prevent further harm to the world’s ecosystems, there is a dire need for sustainable waste management practices that will safeguard the environment for future generations. Waste Management: Concepts, Methodologies, Tools, and Applications is a vital reference source that examines the management of different types of wastes and provides relevant theoretical frameworks about new waste management technologies for the control of air, water, and soil pollution. Highlighting a range of topics such as contaminant removal, landfill treatment, and recycling, this multi-volume book is ideally designed for environmental engineers, waste authorities, solid waste management companies, landfill operators, legislators, environmentalists, policymakers, government officials, academicians, researchers, and students.
Constructed wetlands are proving to be the best natural treatment system for landfill leachates. Most of the contaminants in landfill leachates are degraded in treatment wetlands. Potential for long-term sustainability and significant cost savings are attractive features of this eco-technology. Documentation of the experience in this use of constructed wetlands has been limited. Constructed Wetlands for the Treatment of Landfill Leachates is the first compilation of the results of research from North America and Europe. Originally presented at an international symposium, this collection of papers offers the most recent research findings from the leading researchers in this new and innovative natural treatment system. Specific issues addressed in the text include: leachate characteristics, and the potential for treatability by constructed wetlands wetland treatment, processes and transformation use of constructed wetlands in cold climatic conditions assessment of the tolerance of wetland plants to the toxicity of leachates role of plants in the treatments of leachates integrated wetland systems performance of different wetland treatment systems cost comparisons of wetland technology vs. traditional treatment technologies The potential for environmental contamination due to leachates from landfills is increasing, and there is an urgent need to find ways and means to treat leachates in a sustainable way Constructed Wetlands for the Treatment of Landfill Leachates will provide an invaluable source of information on the subject for scientists, engineers, practitioners, policy makers, and regulatory officials.
Water harvesting is gaining more and more recognition as a sustainable and resilient water supply options. It is economically viable, socially compatible and environmentally friendly. Water harvesting has proven to be a robust solution to overcome or reduce water shortages all over the world. It is important to understand how to apply this practice in a sustainable and effective way to make full use of its potential in a world increasingly threatened by water scarcity. The Handbook of Water Harvesting and Conservation: Basic Concepts and Fundamentals is the most comprehensive, up-to-date and applied handbook on water harvesting and conservation yet published. The book’s 30 chapters -- written by 84 outstanding international experts from approximately 20 selected countries faced by drought -- explore, critique and develop concepts and systems for water harvesting. The editors bring together many perspectives into a synthesis that is both academically based and practical in its potential applications. The Handbook of Water Harvesting and Conservation: Basic Concepts and Fundamentals is an important tool for education, research and technical works in the areas of soil, water and watershed management and is highly useful for drought strategy planning, flood management and developing techniques to adapt to climate change in urban, agricultural, forest and

rangeland areas.

Municipal solid waste (MSW) disposal is an ever-increasing problem in many parts of the world, especially in developing countries. To date, landfilling is still the preferred option for the disposal and management of MSW due to its low-cost operation. While this solution is advantageous from a cost perspective, it introduces a high level of potential pollutants which can be detrimental to the local environment. Control and Treatment of Landfill Leachate for Sanitary Waste Disposal presents research-based insights and solutions for the proper management and treatment of landfill leachate. Highlighting relevant topics on emerging technologies and treatment innovations for minimizing the environmental hazards of waste disposal, this innovative publication contributes to filling in many of the gaps that exist in the current literature available on leachate treatment. Waste authorities, solid waste management companies, landfill operators, legislators, environmentalists, graduate students, and researchers will find this publication beneficial to their professional and academic interests in the area of waste treatment and management.

Mechanism and Design of Sequencing Batch Reactors

The production of wastewater from various human and industrial activities has a harsh impact on the environment. Without adequate treatment, the disposal of this wastewater poses a threat to the quality of water globally. Technologies for the Treatment and Recovery of Nutrients from Industrial Wastewater investigates emergent research and best practices within the field of wastewater management. Highlighting novel technological tools in wastewater treatment, effective nutrient removal technologies, and innovative solutions to quality water preservation practices, this book is a critical reference source for professionals, scientists, academics, and students.

A year-long, bench-scale treatability study was performed to assess whether an activated sludge sequencing batch reactor could be used to treat an influent stream of 50/50 (v/v) municipal wastewater and landfill leachate to discharge standards established by the Oregon Department of Environmental Quality. One primary obstacle that was exposed during this study was incomplete nitrification that resulted in high effluent nitrite (NO_2-N) for many months of the study. The data presented in this thesis was collected as a response to this issue. In an effort to remedy the partial nitrification issue, as well as to address other contaminants that were not being effectively treated by the SBR (including recalcitrant COD, metals, and color), abiotic pretreatments were analyzed. These pretreatments included sorption by powder activated carbon (PAC), coagulation and flocculation by ferric chloride ($FeCl_3$), and precipitation by sodium hydroxide (NaOH). Biological batch experiments using pretreated influent were conducted to determine each pretreatment's effect on nitrification activity. While the pretreatments influenced removal of the contaminants named above to varying degrees, there was little indication that these pretreatments affected nitrification rates. It was found that nitrification was greatly influenced by ammonia loading and pH. Both are factors that contribute greatly to the formation of inhibitory free ammonia (FA). Temperature and aeration intensity also play a significant role in ensuring complete nitrification. Using experimental nitrification rate data, modeled analyses of limitation by FA in addition to low dissolved oxygen (DO) were generated. These modeled analyses indicated that inhibition of ammonia-oxidizing bacteria (AOBs) were primarily affected by low DO while inhibition of nitrite-oxidizing bacteria (NOBs) were affected by both FA and low DO. Over time, our system was able to sustain complete nitrification at temperatures as low as 16 °C with an average DO concentration that remained far below 0.5 mg/L DO during active aerobic treatment. This is likely due to the effects of a long solids retention time (SRT) that aided the enrichment of nitrifying bacteria with enhanced oxygen affinity as well as seasonally decreased ammonia loading to the system. The 16S rRNA genome of reactor sludge treating the 50/50 (v/v) leachate and wastewater influent was compared to reactor sludge treating wastewater alone in order to clarify what microbial

populations become enriched in the presence of leachate. Overall, it was found that, with the addition of leachate, a small number of taxa came to represent a greater fraction of the microbial population given analysis at the phylum, class, and genus level. At the genus level, a number of genera of carbon degraders were enriched with the addition of leachate as were AOBs. Alternatively, NOBs were greatly reduced. Additionally, Droplet Digital PCR analyses of nitrifying populations over time revealed that [beta]-proteobacterial AOBs became enriched following the addition of leachate due to increased ammonia loading. It is likely that their populations decreased with decreasing temperature and increased with increasing aeration. Looking temporally at NOB populations, it became clear that leachate addition was inhibitory to Nitrospira-like NOBs that thrive under low substrate and low FA conditions and thus their populations significantly decreased in leachate-treating SBRs. In time, a population of Nitobacter-like NOBs, which dominate under high-substrate conditions, came to exist and contributed to sustained complete nitrification in the system. The results of this work demonstrate that the issue of incomplete nitrification and nitrite buildup in the SBR during the first six months of operation with a 50/50 (v/v) wastewater and leachate influent was most likely a result of low DO concentrations in the reactor, FA at levels inhibitory to NOBs, and a resultant ineffectual NOB population.

The anaerobic process is considered to be a sustainable technology for organic waste treatment mainly due to its lower energy consumption and production of residual solids coupled with the prospect of energy recovery from the biogas generated. However, the anaerobic process cannot be seen as providing the ‘complete’ solution as its treated effluents would typically not meet the desired discharge limits in terms of residual carbon, nutrients and pathogens. This has given impetus to subsequent post treatment in order to meet the environmental legislations and protect the receiving water bodies and environment. This book discusses anaerobic treatment from the perspective of organic wastes and wastewaters (municipal and industrial) followed by various post-treatment options for anaerobic effluent polishing and resource recovery. Coverage will also be from the perspective of future trends and thoughts on anaerobic technologies being able to support meeting the increasingly stringent disposal standards. The resource recovery angle is particularly interesting as this can arguably help achieve the circular economy. It is intended the information can be used to identify appropriate solutions for anaerobic effluent treatment and possible alternative approaches to the commonly applied post-treatment techniques. The succeeding discussion is intended to lead on to identification of opportunities for further research and development. This book can be used as a standard reference book and textbook in universities for Master and Doctoral students. The academic community relevant to the subject, namely faculty, researchers, scientists, and practicing engineers, will find the book both informative and as a useful source of successful case studies.

Population growth and industrial development have increased the amount of wastewater generated by urban areas, and one of the major problems facing industrialized nations is the contamination of the environment by hazardous chemicals. Therefore, to meet the standards, suitable treatment alternatives should be established. Advanced Oxidation Processes (AOPs) in Water and Wastewater Treatment is a pivotal reference source that provides vital research on the current,

green, and advanced technologies for wastewater treatment. While highlighting topics such as groundwater treatment, environmental legislation, and oxidation processes, this publication explores the contamination of environments by hazardous chemicals as well as the methods of decontamination and the reduction of negative effects on the environment. This book is a vital reference source for environmental engineers, waste authorities, solid waste management companies, landfill operators, legislators, environmentalists, and academicians seeking current research on achieving sustainable management for wastewater treatment.

This book provides useful information about bioremediation, phytoremediation, and mycoremediation of wastewater and some aspects of the chemical wastewater treatment processes, including ion exchange, neutralization, adsorption, and disinfection. Additionally, this book elucidates and illustrates the wastewater treatment plants in terms of plant sizing, plant layout, plant design, and plant location. Cutting-edge topics include wet air oxidation of aqueous wastes, biodegradation of nitroaromatic compounds, biological treatment of sanitary landfill leachate, bacterial strains for the bioremediation of olive mill wastewater, gelation of arabinoxylans from maize wastewater, and modeling wastewater evolution.

As the global population grows and many developing countries modernize, the importance of water supply and wastewater treatment becomes a much greater factor in the welfare of nations. Clearly, in today’s world the competition for water resources coupled with the unfortunate commingling of wastewater discharges with freshwater supplies creates additional pressure on treatment systems. Recently, researchers focus on wastewater treatment by difference methods with minimal cost and maximum efficiency. This volume of the Wastewater Engineering: Advanced Wastewater Treatment Systems is a selection of topics related to physical-chemical and biological processes with an emphasis on their industrial applications. It gives an overview of various aspects in wastewater treatments methods including topics such as biological, bioremediation, electrochemical, membrane and physical-chemical applications. Experts in the area of environmental sciences from diverse institutions worldwide have contributed to this book, which should prove to be useful to students, teachers, and researchers in the disciplines of wastewater engineering, chemical engineering, environmental engineering, and biotechnology. We gratefully acknowledge the cooperation and support of all the contributing authors.

This book presents some of the latest technologies in waste management, and emphasizes the benefits that can be gained from the use of recycled products. Divided into four sections, it deals with phytoremediation, acquatic weed management and the treatment of solid- and water-based wastes, such as those arising from agricultural, industrial and medical activities. With its special emphasis on the utilization of recycled products, this volume will be of interest to students, academicians, policy makers and others who have a practical and academic interest in dealing with the waste

society generates.

A year-long bench-scale treatability study was performed to assess the feasibility of using an activated sludge sequencing batch reactor (SBR) to treat a mixture of domestic wastewater and landfill leachate. A 50/50 (v/v) of domestic wastewater and landfill leachate was treated in a 1 L SBR operated on a 12 hour cycle with a hydraulic retention time (HRT) of 4 days, mean solids retention time (SRT) no less than 25 days, and an average mixed liquor volatile suspended solids (MLVSS) of 2500 ± 500 mg/L. The combined influent had high chemical oxygen demand (COD) and total ammonia nitrogen (TAN), with average concentrations exceeding 1500 mg/L and 450 mg N/L respectively. The combined influent had a carbonaceous biochemical oxygen demand (CBOD5) to COD ratio of 40 ± 10%, a TAN to COD ratio of 26 ± 7%, and also showed seasonal variability in pollutant loadings due to changes in rainfall. The SBR was capable of meeting effluent targets for 5-day carbonaceous biochemical oxygen demand (CBOD5) and TAN, which were 10 mg/L and 5 mg N/L respectively, at loadings of up to 100 mg CBOD5/L-d and 140 mg N/L-d. However, during the first 8 months, CBOD5 removal was less consistent, with effluent values often above 20 mg/L, after which time effluent CBOD5 was consistently below 20 mg/L. Filtration reduced effluent CBOD5 by 50%, suggesting that a significant fraction was association with particulate matter. Nitrification performance was inconsistent during the first 7 months of operation, with accumulation of both TAN and NO2-N, although good nitrification performance was eventually attained with complete nitrification of TAN to NO3-N and almost 100% TAN removal. The decreased nitrification performance was most likely related to factors such as excess ammonia loading, aeration intensity, and free ammonia, rather than other inhibitory substances in the landfill leachate such as metals or organics. Aeration adjustments under different loading scenarios showed that the extent of nitrification was highly affected by aeration intensity, with improved nitrification observed with increased aeration. Increased aeration resulted in the complete nitrification of TAN to NO3-N with effluent TAN and CBOD below target values for a combined influent of 67% landfill leachate and 33% wastewater. Denitrification was achieved only with the addition of methanol, which could provide another option for nitrogen removal in the SBR if reduction of NO2-N or NO3-N is needed. Average phosphorus removal in the SBR was approximately 10%. Based on mass wasting of reactor sludge, the reduction in phosphorus corresponded to normal microbial uptake and not to the presence of phosphorus accumulating organisms (PAOs). Metals analysis showed effluent manganese to be consistently below the preliminary target value of 5 mg/L and that reactor solids contained regulated heavy metals at concentrations well below the EPA ceiling limits for land application. Volatile organics and pesticides selected as additional preliminary target pollutants were either well below target limits or were not detected at all in the SBR effluent, although additional data may be needed to further verify whether these contaminants would be an issue in terms of effluent requirements.

Water and Wastewater Treatment Technologies theme is a component of Encyclopedia of Water Sciences, Engineering and Technology Resources in the global Encyclopedia of Life Support Systems (EOLSS), which is an integrated compendium of twenty one Encyclopedias. The Theme on Water and Wastewater Treatment Technologies deals, in three volumes, and covers several topics, with several issues of great relevance to our world such as: Urban Wastewater Treatment; Characteristics of Effluent Organic Matter in Wastewater; Filtration Technologies in wastewater treatment; Air Stripping in Industrial Wastewater Treatment; Dissolved air flotation in industrial wastewater treatment; Membrane Technology for Organic Removal in Wastewater; Adsorption and Biological Filtration in Wastewater Treatment; Physico-chemical processes for Organic removal from wastewater effluent; Deep Bed Filtration: Modelling Theory And Practice ; Specific options in biological wastewater treatment for reclamation and reuse ; Biological Phosphorus Removal Processes For Wastewater Treatment ; Sequencing Batch Reactors: Principles, Design/Operation And Case Studies ; Wastewater stabilization ponds (WSP)for wastewater treatment; Treatment of industrial wastewater by membrane bioreactors; Stormwater treatment technologies; Sludge Treatment Technologies ; Wastewater Treatment Technology For Tanning Industry; Palm Oil And Palm Waste Potential In Indonesia ; Recirculating Aquaculture Systems – A Review ; Upflow anaerobic sludge blanket (UASB)reactor in wastewater treatment; Applied Technologies In Municipal Solid Waste Landfill Leachate Treatment; Water Mining: Planning and Implementation Issues for a successful project; Assessment methodologies for water reuse scheme and technology; Nanotechnology for Wastewater Treatment. These three volumes are aimed at the following five major target audiences: University and College students Educators, Professional practitioners, Research personnel and Policy analysts, Managers, and Decision makers and NGOs.

This book gathers papers presented at the International Conference on Advanced Intelligent Systems for Sustainable Development (AI2SD-2018), which was held in Tangiers, Morocco on 12–14 July 2018. It highlights how advanced intelligent systems have successfully been used to develop tools and techniques for modeling, prediction and decision support in connection with the environment. Though chiefly intended for researchers and practitioners in advanced intelligent systems for sustainable development, the book will also be of interest to those working in environment and the Internet of Things, environment and big data analysis, summarization, prediction, remote sensing & geo-information, geophysics, marine and coastal environments, and sensor networks for environment services.

Pollution and ways to combat it have become topics of great concern for researchers. One of the most important dimensions of this global crisis is wastewater, which can often become contaminated with heavy metals such as lead, mercury, and arsenic, which are released from different industrial wastes, mines, and agricultural runoff. Bioremediation of such heavy metals has been extensively studied using different groups of bacteria, fungi, and algae, and has been

considered as a safer, eco-friendly, and cost-effective option for mitigation of contaminated wasteland. The toxicity of water impacts all of society, and so it is of great importance that we understand the better, cleaner, and more efficient ways of treating water. Recent Advancements in Bioremediation of Metal Contaminants is a pivotal reference source that explores bioremediation of pollutants from industrial wastes and examines the role of diverse forms of microbes in bioremediation of wastewater. Covering a broad range of topics including microorganism tolerance, phytoremediation, and fungi, the role of different extremophiles and biofilms in bioremediation are also discussed. This book is ideally designed for environmentalists, engineers, policymakers, academicians, researchers, and students in the fields of microbiology, toxicology, environmental chemistry, and soil and water science.

This collection of research papers, presented at meetings organised by the Wessex Institute of Technology (WIT), concerns a variety of issues relating to the area of sustainable development. WIT has a long and very successful record of organising conferences on the topic of sustainability, which requires an interdisciplinary approach. Any sustainable solutions that are derived solely from the perspective of a single discipline may have unintended damaging consequences that create new problems. Thus effective sustainable solutions require the collaboration of scientists and engineers from various disciplines, as well as planners, architects, environmentalists, policy makers, social scientists, and economists. The contents of this book reflect that interdisciplinary approach, and include topics under the main areas of: Sustainable development and planning; Disaster management; Air pollution; Urban transport; Ecosystems and Water resources management.

Presenting effective, practicable strategies modeled from ultramodern technologies and framed by the critical insights of 78 field experts, this vastly expanded Second Edition offers 32 chapters of industry- and waste-specific analyses and treatment methods for industrial and hazardous waste materials-from explosive wastes to landfill leachate to w

This book contains a collection of research works focused on the biodegradation of different types of pollutants, both in water and solids. The book is divided in three major sections: A) Biodegradation of organic pollutants in solids and wastewater, B) Biodegradation of complex pollutants, and C) Novel technologies in biodegradation and bioremediation.

This volume discusses the theoretical fundamentals and potential applications of the original electro-Fenton (EF) process and its most innovative and promising versions, all of which are classified as electrochemical advanced oxidation processes. It consists of 15 chapters that review the latest advances and trends, material selection, reaction and reactor modeling and EF scale-up. It particularly focuses on the applications of EF process in the treatment of toxic and persistent organic pollutants in water and soil, showing highly efficient removal for both lab-scale and pre-pilot setups. Indeed, the EF technology is now mature enough to be brought to market, and this collection of contributions from

leading experts in the field constitutes a timely milestone for scientists and engineers.

Solid waste management is a global concern, and landfilling remains the predominant management method in most areas of the world. This book provides a comprehensive view of state-of-the-art methods to manage landfills more sustainably, drawing upon more than two decades of research, design, and operational experiences at operating sites across the world. Sustainable landfills implement one or multiple technologies to control and enhance the degradation of waste materials to realize a multitude of potential benefits during or shortly after the landfill's operating phase. This book presents detailed approaches in the development, design, operation, and monitoring of sustainable landfills. Case studies showcasing the benefits and challenges of sustainable landfill technologies are also provided to give the reader additional context. The intent of the book is to serve as a reference guide for regulatory personnel, a practical tool for designers and engineers to build on for site-specific applications of sustainable landfill technologies, and a comprehensive resource for researchers who are continuing to explore new and better ways to more sustainably manage waste materials.

Topic Editor Byong-Hun Jeon has patents related to the Research Topic. All other topic editors declare no competing interests with regard to the Research Topic subject.

The utilisation of a willow vegetation filter for the treatment of landfill leachate is an environmentally and economically appealing solution for landfill operators. Investigations into the design and efficacy of the system, the effects of landfill leachate irrigation on soil ecology, soil chemistry and willow growth were undertaken. Two low cost, high density polyethylene-lined experimental willow plots (25x50 m2) were installed at Cranford landfill, Northamptonshire, UK, and irrigated with landfill leachate between June 2001 and October 2005. During the growing season, leachate volume was often reduced to zero. On other occasions, maximum removal efficiencies of between 33 % and 75 % for total Kjeldahl nitrogen, chemical oxygen demand and sodium, potassium and chloride ions were determined in landfill leachate effluent samples. The addition of landfill leachate produced no negative effects on both soil and foliar macronutrients, which were found to be in the range for sufficient or optimum growth and where additional fertilisers would not bring about a further increase in yields. The effects of landfill leachate application on soil microbial communities were explored and were found to be significantly higher for dehydrogenase activity and ammonium oxidising bacteria in the plot receiving a higher rate of leachate application. An economic analysis was carried out to demonstrate the financial viability of a willow vegetation filter as a treatment for landfill leachate. Willow vegetation filters could provide a desirable alternative to conventional treatment systems, such as sequencing batch reactors, as they incur lower capital expenses and potentially similar operational costs. This study also identified additional revenue benefits in the region of £94 per hectare for wood chip

heat/energy production. The results from the willow vegetation filter under investigation in this study demonstrated that this type of system can be effective, in terms of volume reduction and removal efficiency in landfill leachate, with no detrimental effect upon the trees or surrounding environment.

The report highlights various types of SBRs, design considerations and procedures, equipment required, and experiences gained from practical applications. This report will help both designers and operators of SBRs understand how to use this technology successfully. The focus is on the application of fill-and-draw, variable volume, periodically operated, unsteady-state principles to activated sludge systems. Research findings are presented, from both the laboratory and pilot and full scale SBRs. Also included is a description of trends for technological developments and a discussion of open questions regarding research, development, application, and operation. Contents Introduction Fundamentals of Periodic Processes General Overview of SBR Applications Design of Activated Sludge SBR Plants Equipment and Instrumentation Practical Experiences Evaluation of SBR Facilities in Australia Evaluation of SBR Facilities in the USA and Canada Evaluation of SBR Facilities in Germany Evaluation of SBR Facilities in France Evaluation of SBR facilities in Japan Scientific and Technical Report No. 10

Increasing demand on industrial capacity has, as an unintended consequence, produced an accompanying increase in harmful and hazardous wastes. Derived from the second edition of the popular Handbook of Industrial and Hazardous Wastes Treatment, Hazardous Industrial Waste Treatment outlines the fundamentals and latest developments in hazardous waste

Civil and environmental engineers work together to develop, build, and maintain the man-made and natural environments that make up the infrastructures and ecosystems in which we live and thrive. Civil and Environmental Engineering: Concepts, Methodologies, Tools, and Applications is a comprehensive multi-volume publication showcasing the best research on topics pertaining to road design, building maintenance and construction, transportation, earthquake engineering, waste and pollution management, and water resources management and engineering. Through its broad and extensive coverage on a variety of crucial concepts in the field of civil engineering, and its subfield of environmental engineering, this multi-volume work is an essential addition to the library collections of academic and government institutions and appropriately meets the research needs of engineers, environmental specialists, researchers, and graduate-level students.

Containing papers from the ninth International Conference on Sustainable Water Resources Management, this book presents the work of scientists, practitioners and other experts regarding recent technological and scientific developments associated with the management of surface and sub-surface water resources. Water is essential for

sustaining life on our planet, nevertheless its unequal distribution is a source of permanent conflict. It is predicted that population growth and irregular rainfall, due to climate change, may lead to more restricted access to water in certain regions of the world. This problem is made even more severe by human actions that can cause degradation to nature and the environment. These papers cover such topics as: Water management and planning; Water rights and accessibility; Water markets economics and policies; Climate change; Sedimental soil erosion; Irrigation; Water resources in arid regions; Ground water; Urban water management; Hydraulic engineering; Trans-boundary water management; Water, food and energy; Socio-economic aspects; Innovative technologies; Water and the community; Integrated water analysis; Wetlands as water sources.

Treatment of Landfill Leachate by Using an Anaerobic Sequencing Batch Reactor (AnA2/O2SBR)Landfill Leachate Treatment by Combination of Electro - Fenton and Sequencing Batch Reactor MethodBiological Treatment of Landfill Leachate Using Sequencing Batch ReactorLandfill Leachate Treatment by Using Biogranular Sequencing Batch Reactor (SBR)Co-treatment of Municipal Wastewater and Landfill Leachate in an Activated Sludge Sequencing Batch Reactor

Aims to establish leachate treatability of different types of leachate, characterise leachate and effluent quality, determine alkalinity requirements, assess hydraulic retention periods and sludge production and confirm whether leachate quality can inhibit successful treatment in a sequencing batch reactor system.

This book presents an in-depth, science-based approach to applying key project-management and spatial tools and practices in environmental projects. Providing important data for those considering projects that balance social-economic growth against minimizing its ill-effects on planet Earth, the book discusses various aspects of environmental engineering, as well as formula and analytical approaches required for more informed decision-making. Beginning with a broad overview of the factors and features of environmental processes and management, the book then clearly details the general application of fundamental processes, the characteristics of the different systems in which they occur, and the way in which these factors influence process dynamics, environmental systems, and their possible remedies. While primarily intended for professionals responsible for the management of environmental projects or interested in improving the overall efficiency of such projects, it is also useful for managers in the private, public, and not-for-profit sectors. Further, it is a valuable resource for students at both undergraduate and postgraduate levels, and an indispensable guide for anyone wanting to develop their skills in modern environmental management and related techniques.

The world is currently experiencing increased environmental contamination with solid waste, which is one of the greatest environmental threats today. Although solid waste is harmful, proper management and profitable recycling can make it beneficial to the environment. In this regard, estimation of the true quantities of solid wastes generated annually in developed and developing countries is important for evaluating suitable strategies for economic and sustainable procedures of waste management. This book presents an interesting review of the economics of solid waste management in various developing and developed countries. It

examines several economic applications of solid waste, such as innovative methods to generate bioelectricity from organic waste using microbial fuel cells and using solid waste as an alternative fuel in cement kilns.