Contents

Welcome Address

TORU FURUICHI
Chairperson, APLAS Ho Chi Minh 2014
President of NPO, LSA Japan
(Professor, Hokkaido University)

I would like to express my sincere congratulations to all involved in the significant holding of the Eighth Asian-Pacific Landfill Symposium in Ho Chi Min, Vietnam, and to express my sincere gratitude to many people taking part in the event from Asian Pacific nations and many countries across the world. I am also pleased to share with all participants the pleasure of this opportunity for researchers, engineers, government officials and many other specialists involved in tackling waste problems faced by Asia-Pacific countries to assemble and exchange their latest research results and experiences.

The earth now faces a crisis that is unprecedented in the history of mankind, including natural disasters such as earthquake and Tsunami, increased temperatures, unusual weather conditions involving floods and droughts, desertification as a result of deforestation et al. The APLAS Symposium has become one of major international meetings of the Asia-Pacific region for the discussion of waste problems at research and practical level. This indicates the need to expand our view of global environmental problems in relation to waste management instead of focusing on landfill alone.

At the same time, the issues related to final landfill sites, which were the original theme of the APLAS Symposium, are also a hot topic of discussion. With the transition of the concept of final landfill sites, there is now a particular need for transparency in waste treatment processes from generation to landfill in order to eliminate anxiety over the construction and maintenance of final landfill sites. The transparency of final landfill sites as a technical dimension to control the waste management process (improving safety) and the information disclosure as a social dimension and community development involving local residents (developing a sense of reassurance and reliability) are simultaneously important key points. The difference that should be highlighted here now is that conventional discussions on treatment facilities have revolved around the facilities themselves, whereas the essential new concepts related to “material flow and conversion” and “social systems” proposed in a sound material-cycle society should be more important and included in discussions from now on.

Many recyclable waste materials can be found at inappropriate final landfill sites mixed in with hazardous substances. To guide overall terminal waste management systems in the right direction, it is important to establish technologies and social institutions for treating the effects of hazardous waste and recycling useful waste, leading to the regeneration and the space recovery of final landfill sites for use over a longer time frame. This means that landfilling function should be considered as one of “systems” for proper waste management, namely as a final proper disposal system, instead of a final landfill site.

As already mentioned, APLAS Ho Chi Min 2014 involves a wide range of discussions on issues related to waste management, and especially focuses on the Business Session & Business Exhibition sponsored by many companies. I strongly believe that the outcome will help to resolve the waste problems faced by many countries in the Asian-Pacific region and around the world, as well as providing insights toward the resolution of global environmental problems.

Welcome Address

VU DINH THANH
Chairperson, APLAS Ho Chi Minh 2014
Rector, Ho Chi Minh City University of Technology

Dear distinguished Guests

On behalf of the Symposium Organizing Committee and Board of Director Ho Chi Minh City University of Technology (HCMUT), I would like to express my sincere gratitude to many people from a number of local and international organizations. I am also pleased to share with all participants the pleasure of this opportunity for researchers, engineers, government officials, businessmen, and many other specialists involved in tackling waste problems faced by Asia-Pacific countries to assemble and exchange their latest research results and experiences.

Vietnam is in the accelerating industrialization and modernization. It is target that by 2020, Vietnam is to become more industrialized and modernized, hence, including the role of science and technology which is a very important factor. As an example, our government has declared the need to promote research, application and transfer environmental technology, clean technology and environmental friendly, development of treatment technologies and recycling, reuse of waste; promote the application of informatics technology in environmental protection; building and scaling model of cleaner production; establishment and development of the environment industry, market making, promoting the environmental services business and economic development of environment.

In this symposium, together with presentation of research finding and business in each of their areas of expertise, scientist and businessmen will have the opportunity to exchange information, views and research methods as well as to share organization experiences, to collaborate in developing and implementing projects and research programs as well as methods and applications in the environmental field and certain areas.

Through this opportunity, I look forward to the partnership between Landfill System Analysis (LSA) and Ho Chi Minh City University of Technology (HCMUT) and to strengthen cooperation and long term sustainability furtherly. I also hope that the Landfill System Analysis (LSA) continues to support the Faculty of Environment and Natural Resources-Ho Chi Minh City University of Technology (HCMUT). From these programs, the young staff of the Faculty will have the opportunity to participate scientist research, study tours, exchange experiences to develop new technologies found in solving environmental pollution in response to the rise of natural disasters and potential risks of global climate change.

Finally, I would like to wish all of you, our dear delegates, distinguished guests, scientists, businessmen, to continue to succeed in the research and in developing the applied science into practical environmental protection.

Happy successful symposium.

Organization

Organized by

The Landfill Systems & Technologies Research Association of Japan, NPO (NPO, LSA)

Ho Chi Minh City University of Technology (HCMUT)

Founder of APLAS

Masataka Hanashima

Chairpersons

Toru Furuichi *(President of NPO, LSA)*
Vu Dinh Thanh *(Rector of HCMUT)*

Supported by

Vietnam Urban Environment & Industrial Zone Association (VUERIA)
Sudokwon Landfill Site Management Corporation (SLC)
JICA Viet Nam Office
Japan Federation of Waste Management Associations and Foundations, Committee on International Affairs for Waste management (JFWMA&F)

Secretariat

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Secretary General: *Fumiyoshi Ohno*
Kazuei Ishii
Shungo Soeda
Isamu Norimatsu

Local Organizing Committee
Chairman: Nguyen Phuoc Dan
(Dean, Faculty of Environment, HCMUT, Vietnam)

Certificate of Appreciation

Business session & business exhibition

Actree Corporation
Chugai Technos Corporation
Eight – Japan Engineering Consultants Inc.
Hitachi Zosen Corporation (Hitz)
Ichikawa Kankyo Engineering Co., Ltd. (IKE)
K.K. Satisfactory International
Kobelco Eco-Solutions Co., Ltd.
ShinMaywa Industries, Ltd.
Tsuneishi Kamtecs Corporation
Yachiyo Engineering Co., Ltd.

Business exhibition

EX Research Institute Ltd.
Japan Industrial Waste Information Center (JW)
Shimizu Corporation
Swing Corporation

Sponsored by

Ikkou Co., Ltd.
Mitsuboshi Belting Ltd.
Nihon Safety Co., Ltd.
Taiyo Kogyo Corporation
Tosoh Nikkemi Corporation
Toyobo Co., Ltd.

Time Schedule for APLAS Ho Chi Minh 2014

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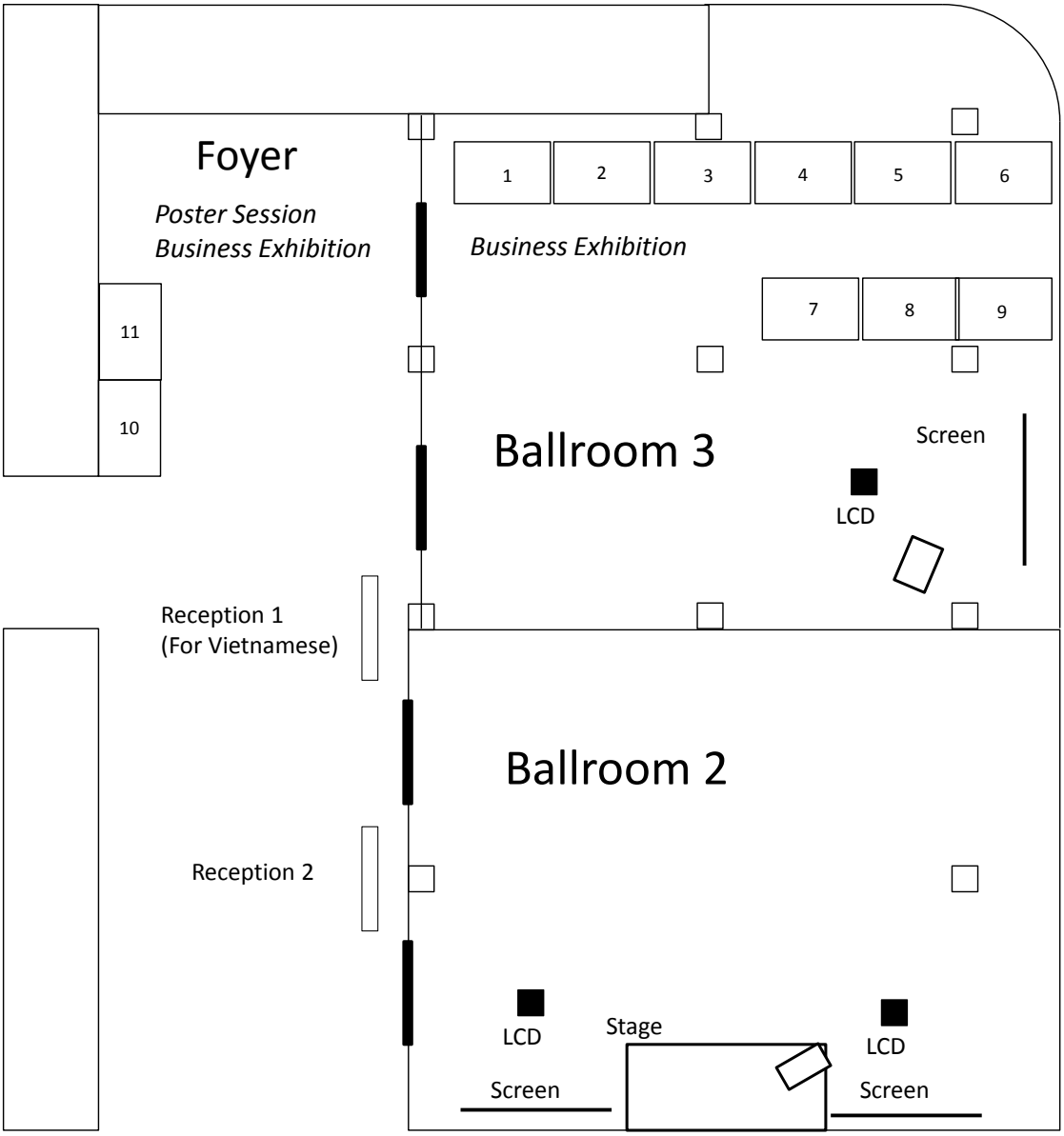
Note: The simultaneous interpreter (English⇔Vietnamese) is available in Business session.

Symposium Floor Plan

Windsor Hotel 7th floor



Business Exhibition

1. Hitachi Zosen Corporation (Hitz)
2. Kobellco Eco-Solutions Co., Ltd.
3. Ichikawa Kankyo Engineering Co., Ltd. (IKE)
4. Tsuneishi Kamtecs Corporation
5. ShinMaywa Industries, Ltd.
6. Eight – Japan Engineering Consultants Inc.
7. K.K. Satisfactory International
8. Chugai Technos Corporation
9. Actree Corporation
10. LSA
11. Yachiyo Engineering Co., Ltd., EX Research Institute Ltd., Shimizu Corporation, Swing Corporation

Opening Ceremony ***(Ballroom 2, 10:00 – 10:50)***

Welcome Addresses by

Toru Furuichi */ Chairperson of APLAS Ho Chi Minh 2014; President, The Landfill Systems & Technologies Research Association of Japan, NPO, Professor, Hokkaido University; Japan*

Vu Dinh Thanh */ Chairperson of APLAS Ho Chi Minh 2014;Rector of Ho Chi Minh City University of Technology, Vietnam*

Delegate from Ho Chi Minh City */Ho Chi Minh City, Vietnam*

Nguyen Huu Dung */ Member of the executive of Vietnam Urban Environment and Industrial Zone Association, General Director of Institute of Urban Environment and Industry of Vietnam, Vietnam*

Jaeyong Song */President, Sudokwon Landfill Site Management Corporation, Korea*

Ryuji Tomisaka */Director, Office of Sound-Material-Cycle Society,Waste Management and Recycling Department, Ministry of the Environment, Japan*

Kazuyoshi Okazawa */President, Japan Industrial Waste Information Center, Japan*

Keynote Lecture ***(Ballroom 2, 11:00 – 12:00)***

KL-1 **Enri Damanhuri** / Professor, Institute of Technology Bandung, Indonesia
Current Situation and Perspective of Landfill Sites in Indonesia

KL-2 **Kaimin Shih** / Associate Professor, The University of Hong Kong, China
The Path of Waste Management in Hong Kong

Oral Session 1 *(Ballroom 2, 13:30 – 15:30)*

Landfilling

Chairmen / Nguyen Tan Phong (Vietnam) and Sadahiko Usami (Japan)

1-1 Emenda Sembiring and Yufienda Novitasari (Indonesia)
Effect of Media on Degradation of Degradable Plastics

1-2 Kyeong-ho Lee, Jong-chul Won, Yun-hee Kim (Korea)
The influence of the temperature distribution on the condensate removing devices in landfill

1-3 Vo Thanh Tung, Lam Minh Thuong, Trieu Tan Phuoc, Nguyen Tan Phong (Vietnam)
Applying Snap Technology to Treat Nitrogen from Old Landfill Leachate

1-4 Sri Darwati and Elis Hastuti (Indonesia)
Performance Improvement of Leachate Treatment Plant Using Biofilter and Subsurface Wetland System

1-5 Dieu, T. T. N, D (Vietnamu); J - L. Vasel (Belgium) and Canh, T. T (Vietnam)
Removal of Nitrogen in Leachate by Using A Membrance Bioreactor Combined with Anoxic Process

1-6 C. Cambroisier, Jupsin (Belgium), H., Keffala (Tunisie), C., H. EL Ouarghi (Morocco) and J.-L. Vasel (Belgium)
Effect of Leachates Characteristics on Leachates Treatment Costs

1-7 Taewoo Kim, Wonback Son, Seoung-hoon Gwon and Young-bok Park (Korea)
A Method of Predicting Long-Term Settlement at a Waste Landfill Site Where Reclamation Has Been Completed (A Combination of Bjarngard and Edgers Model and Hyperbolic Method)

Oral Session 2 *(Ballroom 2, 15:45 – 16:45)*

Waste Management Planning

Chairmen /Takeshi Fujiwara (Japan) and Bui Ta Long (Vietnam)

2-1 Bui Ta Long, Duong Ngoc Hieu, Ngo Thi Hong Yen (Vietnam)
Integrated Tool for Management Hazardous Solid Waste in Ho Chi Minh City by Using E-Card and Gis Technology

2-2 Yasuhiro Matsui, Do Thi Thu Trang and Nguyen Phuc Thanh (Japan)
Estimation of Waste Generation on Traditional Markets in Hue City, Vietnam

2-3 Atsushi Fujiyama, Toru Furuichi, Kazuei Ishii, Yu-Chi Weng and Kento Dohi (Japan)
Estimation of the Effective of Introducing Co-Fermentation Systems for Kitchen Waste, Sewage Sludge, and Night Soil Sludge on Costs and Carbon Dioxide Emissions

2-4 Motoki Sasaki, Noboru Tanikawa, Hideaki Murakami (Japan)
Efforts for the Promotion of Appropriate Industrial Waste Management in Japan

Oral Session 3 *(Ballroom 2, 17:00 – 18:00)*

Waste Recycling and Biomass Utilization

Chairmen / Ngo Kim Chi (Vietnam) and Wonback Son (Korea)

3-1 Alice Leney (New Zealand)
Recovery of Cell Phones and Used Lead-Acid Batteries for Recycling from Pacific Island Countries

3-2 Tri Padmi, Sukandar, I Made Wahyu Widyarsana (Indinesia)
Utilization of Remediated Soil and Deoil Drilling Cutting Waste as Mixing Materials in Concrete Block Using Solidification Method

3-3 Yulian Gressando and Samsu Rizal (Indonesia)
Biogas of Animal Faeces in Aceh Besar District: A Projection towards Renewable Energy Development in Aceh

3-4 Nguyen Xuan Dung, Dang Ngọc Phuợong, Chu Thao Khanh, Ngo Kim Chi (Vietnam)
Reduce Biomass Waste to Landfill by Co- Digestion to Biogas for Energy and Utilise Slurry

Oral Session 4 *(Ballroom 3, 17:00 – 18:00)*

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4-2 Yu-Chi Weng, Toru Furuichi, Kazuei Ishii, Atsushi Fujiyama, Ryo Anabuki (Japan)
Study on the Feasibility of Community-Funded Business for Biogas Production by Using Questionnaire Survey - A Case Study in Tokachi Region, Hokkaido

4-3 Sandhi Eko Bramono, Rudy Azrul Arifin, Muhammad Maliki Moersid (Indonesia)
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***MC** / Fumiyoshi Ohno (Japan)*

B-1 **Hisashi Yamauchi** ***/ Yachiyo Engineering Co., Ltd., Japan***

Waste Management Issues and Measures in Vietnam

B-2 **Nguyen Phuc Thanh** ***/ Hitachi Zosen Corporation, Japan***

Energy-from-Waste (EfW) Technology: An appropriate treatment alternative towards sustainable development

B-3 **Daisuke Kamimura / Kobelco Eco-Solutions Co., Ltd., Japan**

Renewable Energy from Waste by KOBELCO Gasification and Melting

Business Session 2 ***(Ballroom 3, 14:30 – 15:30)***

B-4 **Yuri Takano / Ichikawa Kankyo Engineering Co., Ltd., Japan**

Introduction of Waste Management, Intermediate Treatment, and Recycling Business of IKE

B-5 **Hiroshi Hasegawa / Tsuneishi Kamtecs Corporation, Japan**

New Technology for Industrial Waste Treatment

B-6 **Toshitaka Ogiri / ShinMaywa Industries, Ltd., Japan**

Waste Storage, Collection and Transportation System for Vietnam

B-7 **Kazuyuki Hayama/ K.K. Satisfactory International, Japan**

Electronic Manifest System for Ho Chi Minh City

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B-8 **Koki Asaoka / Eight – Japan Engineering Consultants Inc., Japan**

Solid Waste Management Activities of E-J Group Corp. in SE Asia

B-9 **Koji Kawaguchi / Chugai Technos Corporation, Japan**

TAKUMA Municipal Solid Waste Treatment Technologies combined System of Incineration and KOMPOGAS Methane Fermentation process

B-10 **Atsuhiko Inami / Actree Corporation, Japan**

Introduction of ACTREE

B-11 **Fumiyoshi Ohno / LSA, Japan**

The Landfill Systems and Technologies in Japan

Poster session *(Foyer, 18:00 – 19:00 for Discussion)*

Waste Management Planning

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P-2 Tuti Kustiasih and Fitrijani Anggraini (Indonesia)
Intermediate Transfer Facility in Indonesia

Recycling Technology

P-3 Sukandar and Rafida Mustika Wulandari (Indonesia)
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Landfilling

P-4 Toshinori Ichimaru, Ryoji Matsumoto, Takumi Tsuji, Toru Furuichi, Masataka Hanashima (Japan)
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P-5 Sadahiko Usami, Shigeyoshi Imaizumi, Joji Hinobayashi, Kenji Shibata and Shinzo Matsuyama (Japan)
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P-6 Lam Hoang Vu, Nguyen Hoang Phuong, Dao Nhut Linh, Nguyen Tan Phong (Vietnam)
Impact of Dissolved Oxygen on Partial Nitritation for Treating High Ammonium Concentration from Old Landfill Leachate

P-7 Dieu, T. T. N, D, Canh, T. T (Vietnam) and J - L. Vasel (Belgium)
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P-8 Teppei Komiya, Akito Hanaki, and Takayuki Shimaoka (Japan)
A Fundamental Study on the Modeling of Solute Transfer between Mobile and Immobile Regions of Pore Water in a Solid Waste Layer

P-9 Kazuei Ishii, Toru Furuichi, Yuuya Yamaguchi (Japan)
Analysis of Long-term Data for Stabilizing the Waste by comparison between an open system landfill site and Closed System Disposal Facilities

P-10 Tatsuya Yajima and Sotaro Higuchi (Japan)
Evaluation of CO_2 Emissions and the Renewal Process of Landfill Site by Digging

Biomass Utilization

P-11 Koji Kameyama, Teruhito Miyamoto and Yukiyoshi Iwata (Japan)

Evaluation of Biochar, Produced by Pyrolysis of Various Biomass Resources, as Soil Amendment Material for Water Retention

P-12 Sungwook Cho, Bokyoung Joo, Soojeong Ahn, Sangil Lee, Kyeongjae Lee and Jongchoul Won (Korea)

Utilization of HTC (Hydrothermal Carbonization) Product from Wood Waste

Country Reports

P-13 Bijan Bina, Amir Hossein Nafez, Afshin Ebrahimi, Mehdi Hajiannejad (Iran)

Investigations into the Quantity and Compisition of Produced Dental Solid Waste in Isfahan City

ABSTRACTS

[KL-1]

CURRENT SITUATION AND PERSPECTIVE OF LANDFILL SITES IN INDONESIA

Enri Damanhuri
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ABSTRACT

The rapid population growth and diverse activities in large cities in Indonesia have resulted in the emergence of common problems in urban infrastructure services. It is only around 60-70% of the wastes in urban areas in Indonesia that could be transported to the final disposal sites, where simple landfilling are mainly in operation. This paper will highlight the main issues of municipal solid waste landfill situation and its improvement in Indonesia. The Waste Management Law No. 18/2008 states that local governments are obliged to close existing open dumping sites within five years and the improvement of solid waste management is a priority. Through this Law, the central government has been trying to shift the general paradigm of the landfill, that a landfill is not just a solid waste dumping site, but also a waste processing site so that it becomes safer for the environment. For that purpose, the Ministry of Public Works maintains a budget line to provide block grants to the cities to help them to implement the requirements of the law. The central government of Indonesia is committed to close open dumping sites and rehabilitate them to sanitary landfills or controlled landfills. A target has been set to develop/rehabilitate 240 new/old landfills site by the year 2014. The criteria for sanitary landfill are still considered expensive, so Indonesia introduced the term of controlled landfill. The Indonesian version of controlled landfill is the midway towards a satisfactory sanitary landfill operation, among others through delaying the application of the covering layer of soil to once every 5 - 7 days. However, due to limitation of operational budget allocated to this facility by cities/regencies, most of local governments operate their landfill based on business-as-usual as open dump. The main reason for this practice is that it is difficult to provide annual budget to cover the dumping area with soil layers.

Keywords: solid waste, municipal solid waste (MSW), solid waste management, landfilling, open dumping

[KL-2]

THE PATH OF WASTE MANAGEMENT IN HONG KONG

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ABSTRACT

Hong Kong is a typical example of the dynamic metropolitan cities in the world. Its evolution of waste management policy and the challenges faced along the way provide a good learning opportunity for many other booming cities around the world, particularly in the Asia Pacific region. With the fast developing economy, high population density and limited land resource, effective use of current landfills and the other strategies to build a sustainable waste management structure has been always the ultimate goal and challenge for Hong Kong. Moreover, with the urgency of soon reaching the capacities of three strategic landfills in Hong Kong, a clear action plan and the efficient implementation is the pressing need of maintaining the vital functions of this city. A wide range of waste reduction, recycling and treatment schemes were proposed to resolve this urgency in the last 10 years, but the implementation outcomes varied. With the lesson learnt, another 10 year plan “Blueprint for Sustainable Use of Resources” in Hong Kong has been just released. This presentation will introduce the waste management experience of the past 10 years and the outlook for the next 10 year in Hong Kong to reflect the path of managing waste challenges in a fast-developing metropolitan city.

Keywords: Landfill Management, Waste-to-Energy, Policy and Management, Waste Reduction, Sustainable Resources

[1-1]

EFFECT OF MEDIA ON DEGRADATION ON DEGRADABLE PLASTICS

Emenda Sembiring[1*] and Yufienda Novitasari[2]
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ABSTRACT

Plastics on the market are usually made by synthetic polymers that are difficult to decompose in nature. To reduce the impact of plastic waste, nowadays biodegradable and degradable plastics have been introduced into the market. This action attracts local government in Bandung to use degradable plastics for waste storage especially on the road side. Therefore, this study evaluates the end life of degradable plastics in 4 media: soil, waste, composting and water. Two types of plastic materials, @Ecoplas and @Oxium are investigated. @Ecoplas is made f rom natural materials, such as starch, so it can be degraded. @Oxium is a kind of addictive substance that was mixed into pure plastic raw materials in order to speed up the oxidation process. The plastics were put into the soil and waste media for 90 days, composting media for 50 days, anaerobic condition for 21 days, and the river media for 21 days. To confirm the degradability, a series of measures was conducted by measuring the weight and tensile strength. Scanning Electron Microscopy (SEM) test was also conducted to see the morphology of plastics during the experiments. The average of weight loss for @Ecoplas was up to 31% and for @Oxium was up to 20% during 90 days in waste media, whereas, in the soil the average weight loss for @Ecoplas and @Oxium was up to 33% and 28% consecutively. For the tensile strength test, @Ecoplas has decreased 25-27% and @Oxium has decreased 16-17% in soil and waste media.

[1-2]

THE INFLUENCE OF THE TEMPERATURE DISTRIBUTION ON THE CONDENSATE REMOVING DEVICES IN LANDFILL

Kyeong-ho Lee[1,*], Jong-chul Won[1], Yun-hee Kim[1]
[1]Sudokwon Landfill Site Management Corp., 61 Geowolro Seo-Gu, Incheon, Korea, 404-706
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ABSTRACT

LFG is very humid and has high temperature. It cools during its transfer in the piping system and the moisture condensate out into the waste layers. Differential settlement of waste is inevitable in landfill, making low points in the piping systems. The condensate moves to low points in the pipe and restricts flow and vacuum. For this reason, LFG collection piping has condensate removing devices. Typical condensate removing device, which are often called as a trap, requires the water to be maintained under the various suction conditions to prevent vacuum loss and for the proper operation. But the existing devices have limitation for their uses in landfill by the evaporation of water when it comes to dry condition in the landfill.

In this study we investigated the different conditions of the temperature and the possibility of evaporation in the landfill. Results showed that the landfill had different temperature distribution, indicating that lower temperature region cooled down LFG in the transfer pipe, generating condensate, while high temperature region heated the LFG, which might increase the capacity of holding water vapor as much, raising the chance of evaporation of water in trap. Evaporation test showed that in some conditions where especially temperature is high compare to LFG, the evaporation of water in the trap would be high enough to evaporate water within 1 or 2 months, requiring much attention for the application of the use of it and an alternatives to address the limitation.

Keywords: LFG Cooling, Condensate, Trap, Transfer Pipe

[1-3]

APPLYING SNAP TECHNOLOGY TO TREAT NITROGEN FROM OLD LANDFILL LEACHATE

Vo Thanh Tung, Lam Minh Thuong, Trieu Tan Phuoc, Nguyen Tan Phong
Faculty of Environment and Natural Resources, Ho Chi Minh City University of Technology
268 Ly Thuong Kiet Street, District 10, Ho Chi Minh City, Vietnam.

ABSTRACT

Single -stage using anammmox and partial nitritation (SNAP) technology have been applied to evaluate the ability of nitrogen removal in old landfill leachate. This research used the biomass carrier a biofix in the reactor of 6.5 liters. Operating conditions such as hydraulic retention time (HRT), pH, dissolved oxygen (DO) were 12h, 7.5 – 7.8 and 1 – 4.2 mg/l. Temperature was not controlled but depended entirely on ambient air condition which ranged from 27 to 38 0C. The research has been conducted through five of nitrogen loading rate about 0.2, 0.4, 0.6, 0.8, 1.0 kg-N/m3.day. With the maximum of nitrogen removal efficiency (NRE) and ammonium conversion efficiency (ACE) were approximate 85% and 90% respectively. The ACE was proportional to the NRE. The value DO increased with ammonium nitrogen loading influent and was adjusted appropriately as they can. At loading rate 0.4 kg-N/m3.day onwards, they identified that denitrification process occur in reactor. This has contributed to increase nitrogen removal efficiency of the model. The result showed that nitrogen treatment efficiency of SNAP technology is relatively high. It demonstrates its superiority for the treatment of wastewater with high ammonium and low organic concentration compared to other technologies.

Keywords: SNAP, Anammox, Nitritation, Landfill leachate, Biofix

[1-4]

PERFORMANCE IMPROVEMENT OF LEACHATE TREATMENT PLANT USING BIOFILTER AND SUBSURFACE WETLAND SYSTEM

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Research Institute for Human Settlements, Ministry of Public Works Indonesia
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ABSTRACT

Generally , leachate treatment plants in Indonesia are stabilization pond system, some of them are combined with aeration and wetland systems. This paper aims to evaluate the leachate treatment system and to increase processing performance in Final Processing Site Sanggrahan, Temanggung Regency, Indonesia. The methodologies of research are field observations and laboratory measurements. Laboratory analysis of Leachate Treatment Plant, showed the poor performance that demonstrated the high concentration of organic load in the effluent, where as BOD is 2199.60 mg / L and COD is 6800 mg/L , it is far from the standard if it is compared with the standard based on Decree of Environment Ministry no 03 / 91 Class III that effluen of BOD is should be less than 150 mg / L and is less than COD 300 mg/L. The capacity IPL that does not comply with the discharge of leachate that causes the detention time is not met the desain citeria and lack of maintenance. To increase the performance, the existing LTP will be to developed to be biofilter and subsurface wetland system. The principles of these improvement are polutant degradation through biofilm process followed by semi aquatic plant absorption to achieve the effluent for water and nutrient reuse. The treated leachate could be have BOD less than 30 mg/L therefore safely discharge to the river or reused for fish pond or agricultural irrigation.

Keywords : *performance , leachate, treatment, biofilter, subsurface wetland, reuse*

[1-5]

REMOVAL OF NITROGEN IN LEACHATE BY USING A MEMBRANCE BIOREACTOR COMBINED WITH ANOXIC PROCESS

Dieu, T. T. N, D[1], J - L. Vasel[2] and Canh, T. T[3]

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[2] Professor, Department of Environmental Sciences and Management of University of Liege, Longwy Street, 185-B 6700 Arlon, Belgium.

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ABSTRACT

Nitrogen compounds are present as N-organic maters in leachate. Nitrogen compounds are mainly present in leachates as for Ammoniacal Nitrogen (ammonia and ammonium), thus the reduced forms with very small amounts of oxydized forms i.e nitrite and nitrate. In our study, N-NH_3 values for input leachate were 2678 ± 345mg/L. There are various methods to remove the nitrogen contained in leachate: biological or even physical but the cost may be too expensive. The main objective of this study was to assess the feasibility of treating sanitary landfill leachate using a combined anoxic and attached – growth process installed in a Membrance Bioreactor. Landfill leachate was collected from Phuoc Hiep full scale facility landfill site and was diluted to get N-NH_3, TKN, TN, COD input mean concentrations of: 155 mgN /L, 188 mgN /L, 191 mg N/L and 931 mg/L, respectively. Tubular immersed membrane made of polypropylene material with a contact area are 1m^2/unit are used. The system is operated continuously with a total residence time of 144 days. Various sensors (O_2, pressure,….) are being used and a dedicated software has been developed to monitor the signals of the sensors in order to collect the data requested to calibrate the mathematical model of the bioreactor.

The experimental results showed that this process can remove up to 99.05% ammonium, 92,4% TN and 89.09% COD from leachate. A mathematical model is being developed to optimize the system at lab scale.

Keywords: leachate, membrance, anoxic, nitrification, denitrification

[1-6]

EFFECT OF LEACHATES CHARACTERISTICS ON LEACHATES TREATMENT COSTS

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ABSTRACT

Leachates characteristics are quite different from domestic wastewaters. The cost of leachate treatment can be reduced by an appropriate selection of the unit operations needed. Moreover in some cases other liquid residues (waste) can be used as reactants to reduce the operating costs. The biological part of the system is based on a SBR process whose operating parameters are fitted on data collected on site. A sophisticated control scheme depending on the specific characteristics of the leachates is used to optimize the treatment.

Keywords: Leachates, SBR, GAC, nitrification, denitrification, cheap carbon source

[1-7]

A METHOD OF PREDICTING LONG-TERM SETTLEMENT AT A WASTE LANDFILL SITE WHERE RECLAMATION HAS BEEN COMPLETED (A COMBINATION OF BJARNGARD AND EDGERS MODEL AND HYPERBOLIC METHOD)

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ABSTRACT

The SUDOKWON Landfill Site Management Corporation with the large landfill sites is now burying the waste. And the first landfill site belonging the corporation is completed in landfill around 2000. It has been about 14 years after completion and is using for golf courses.

To figure out utilization and stabilization of the landfill site, predicting the future settlement amount using the measured settlement data since its completion is very important. For it, We have to select a appropriate settlement model and find the applicable coefficients.

Until now, We have predicted the settlement amount using the Bjangard & Edgers model which is suitable for this site where has different multi-buried structure. However, it is discovered that this model over predicts more than the actual settlement amount. In this model's equation, the settlement amount is increasing depending on the time, unlike the real tendency, which is converged after some period of the time.

According to the result of a study we did, this process should include the residual settlement stage after waste decomposition, and then we can find the final settlement by adding to a section relating to the residual settlement in the equation. Now, We found out the time when the residual settlement occurs through the measured settlement data, and a similar movement like a hyperbolic function after that time.

In conclusion, We have to add to a process relating to the residual settlement and combine the Bjarngard & Edgers model and a hyperbolic function to predict much more exactly the long term settlement amount depending on the time. Finally, We can predict the settlement which is able to occur, and the time and the amount of settlement with residual settlement movement after decomposition.

Keywords: landfill, applicable coefficients, Bjangard & Edgers, hyperbolic function, settlement

[2-1]

INTEGRATED TOOL FOR MANAGEMENT HAZARDOUS SOLID WASTE IN HO CHI MINH CITYBY USING E-CARD AND GIS TECHNOLOGY

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ABSTRACT

Hazardous solid waste (HSW) in Hochiminh city is very diverse and generated from various different industries. Everyday, the thousands of generators generate directly hundreds of hazardous solid waste to environment. Per year, hundreds of billion Vietnam dong is used transportation, treatment and recovery air pollution - All of the information line diversity and complex need to evaluate, process, implementation of the necessary conclusions and adopted the decision right. Nowadays, management system HSW in Hochiminh city is being still in the process of completing and activities not effective. Some of generators and enterprises participation in the transportation, treatment HSW have not actually self- conscious in execution the law. It was most urgent to the people and causing bad consequence to the environment. This paper is to introduce a new solution to the application of e-manifest, e-card, and GIS technology in storing and searching for data related to the management of hazardous solid waste, as well as conduct more analysis differently on the basis of database is stored to evaluate and plan timely adjustment. The paper carried out for the past time at the Vietnam national university of Hochiminh city, under funding support of the Hochiminh city administration.

Key words: Hazardous solid waste, E-Mainifest, E-card.

[2-2]

ESTIMATION OF WASTE GENERATION ON TRADITIONAL MARKETS IN HUE CITY, VIETNAM

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ABSTRACT

This study provides a detailed description of waste generation and characteristic of 5 markets with different scales in Hue city, located in the central of Vietnam. The authors conducted a waste generation survey and a waste composition survey on 308 kiosks in 5 markets for 8 consecutive days. According to the waste composition, the total potential for recycling and composting of 5 markets were identified.

Keywords: Traditional market, waste generation rate, waste composition, recycling potential, composting potential

[2-3]

ESTIMATION OF THE EFFECTIVE OF INTRODUCING CO-FERMENTATION SYSTEMS FOR KITCHEN WASTE, SEWAGE SLUDGE, AND NIGHT SOIL SLUDGE ON COSTS AND CARBON DIOXIDE EMISSIONS

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ABSTRACT

There are 280 anaerobic fermentation plants for the treatment of sludge in sewage plants in Japan, but only five plants use anaerobic co-fermentation of sewage sludge and kitchen waste. In this study, we evaluated the effectiveness of co-fermentation systems for sewage sludge and kitchen waste in the Japanese cities of Kitahiroshima and Eniwa. Both sewage treatment plants established goals such as extending of the lifespan of landfill sites and reducing the environmental burden. The annual costs (yen/year) and CO_2 emissions (CO_2/year) were estimated before and after the introduction of the co-fermentation systems. This study found that the introduction of a co-fermentation system decreased CO_2 emissions at Kitahiroshima and Eniwa. The costs of commissioning exerted a large effect on the overall cost reductions. Finally, the reduction in CO_2 emissions from landfill sites that received kitchen waste contributed significantly to the overall reduction in CO_2 emissions.

Keywords: co-fermentation, sewage plant, sewage sludge, kitchen waste, effect of introducing.

[2-4]

EFFORTS FOR THE PROMOTION OF APPROPRIATE INDUSTRIAL WASTE MANAGEMENT IN JAPAN

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ABSTRACT

The Waste Management and Public Cleansing Law in Japan (hereafter called the Law) defines two types of waste and clarifies responsibilities of disposal each type for assuring appropriate waste management. Two types of waste are “Industrial Waste” and “Municipal Waste (except industrial waste).” Furthermore, the Municipal Waste is categorized “Business and Commercial Waste” and “Household Waste.” In the case of hazardous wastes are also defined as “Specially Controlled Industrial or Municipal Waste.”

In the industrial and business/commercial waste, the generators of waste (businesses) have the responsibility for waste management. On the other hand, the responsibility of household waste disposal is taken by municipalities.

The Law requires the waste generators to dispose of it themselves or contracting with licensed collectors/transporters and disposers. The waste generators are also required to confirm that their wastes have been disposed of properly by the paper or electronic manifest.

Due to a number of regulations, the Japan Industrial Waste Information Center (hereafter called the JW center) provides several services for the promotion of appropriate industrial waste management. The JW center provides several education and training courses for waste generators, collectors/transporters and disposers of industrial wastes so as to enable them to acquire the specialized knowledge and skills based on the Law. In addition, the JW center is designated by the Minister of the Environment as an Information Processing Center for the implementation and promotion of the electronic manifest system for tracking and verifying the proper disposal of the waste.

Keywords: Industrial Waste Management, Contract, Manifest System, Education and Training Courses, Electronic Manifest

[3-1]

RECOVERY OF CELL PHONES AND USED LEAD-ACID BATTERIES FOR RECYCLING FROM PACIFIC ISLAND COUNTRIES

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ABSTRACT

Pacific Island countries are characteristically comprised of a large number of islands spread over a large oceanic area; many of these islands have no grid electricity, and the advent of cheap solar power has dramatically increased the availability of electricity in households. Coupled with this increased use of photovoltaic solar is an equally large expansion in the use of batteries for electricity storage as part of the solar systems, and these batteries are one of the most hazardous wastes found in such environments. Cell phone usage has also increased dramatically in the Pacific Islands with improved rural coverage and cheap handsets, and it is now possible for most rural households to access cell phone networks as they can recharge phone batteries from these micro solar systems. With internet now available on cell networks and with increasing use of cell phones for financial transactions, solar and cell phones are in an interrelated cycle of strong growth. Both cell phones and used lead-acid batteries are recyclable, and have a commercial value: the challenge is to collect both old phones and batteries from dispersed rural and outer-island homes. This paper examines potential mechanisms to achieve collection, including communication and outreach programmes to target audiences, and incentives to encourage recycling of phones and batteries in Pacific Island environments.

Keywords: Pacific Islands, used lead-acid batteries, cell phones, recycling

[3-2]

UTILIZATION OF REMEDIATED SOIL AND DEOIL DRILLING CUTTING WASTE AS MIXING MATERIALS IN CONCRETE BLOCK USING SOLIDIFICATION METHOD

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ABSTRACT

Oil and gas industry is one of the biggest and developed industrial sectors in Indonesia. This particular industry needs to increase the production level due to the high demand of the market demand. The amount of oil and gas production is increasing along with the amount of waste produced. Soil contaminated by oil spill is one of the waste produced. In referring to The Regulation of Ministry for the Environment in Indonesia, this company could treat contaminated soil waste using bioremediation method and Thermal Desorption Unit waste which produced deoil drilling cutting. These process will reduce the oil content in the waste. Due to the volume of both wastes that continue to increase, a study is conducted to utilize both wastes using solidification method. This experiment is done to observe the potential of both wastes as mixed materials for producingconcrete block by substituting the wastes into cement in mortar mixture. The proportions of cement: fine aggregates are 1:2; 1:3; 1:4 and 1:5. The solidification product is block-shaped sized 5x5x5 cm. Every solidification product is observed in the subjects for compressive strength test, durability test, absorption test, and leaching toxicity /TCLP test. The experiment result show that concrete block compressive strength for all ratio cement : fine agregate in this research are > 70 kg/cm^2, absorption test is < 35%, durability test is < 30%. The results of this research show that both remediated soil and deoil drilling cuttinghave a potency to be used as mixing materials in concrete block product by solidification process. Application both wastes meet the quality standard of concrete block.

Keywords: hazardous waste, remediated soil, deoil drilling cutting,solidification, concrete block.

[3-3]

BIOGAS OF ANIMAL FAECES IN ACEH BESAR DISTRICT: A PROJECTION TOWARDS RENEWABLE ENERGY DEVELOPMENT IN ACEH

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ABSTRACT

Aceh has a large potential of biogas energy development. According to Central Bureau of Statistic's data 2013, the total population of cattle in Aceh Province is 701,284. Since 2012, YKU Foundation has been developing a biogas energy program made of cow and designing a reactor which is simple and affordable by the community. It is constructed from polyethylene (PE) plastic 0.2 mm, with unit price IDR 10,000,000.- (around USD 909.09, with USD 1 = IDR 11,000). Animal waste of 100.000 cows would potentially yield biogas energy as much as 36.000 m^3 (27 million litres of kerosene) / year. If CO_2 emission factor = 2.5359, then CO_2 emission out of kerosene consumption is approximately 68.469.300 kg CO_2/year. From economical perspective, the saving of kerosene at amount of 2,250 kilo litres is equal to IDR 22.5 billion (USD 1.9 million) per month or IDR 270 billion (USD 23.48 million) per year. During 2014, YKU is being an implementing partner of USAID for Indonesia Clean Energy Development (ICED) Program, with the objective to increase people's energy independence and to preserve the environment, to support the improvement of the local economy, and ultimately to reduce the carbon emission as much as 281,000 kg CO_2 per year. It is eventually expected that these activities would contributes to Indonesia emission reduction efforts, and to widespread use of biogas energy specifically in Aceh, and throughout Indonesia in general.

Keywords: Biogas, Cow Faeces, Renewable Energy, Aceh

[3-4]

REDUCE BIOMASS WASTE TO LANDFILL BY CO- DIGESTION TO BIOGAS FOR ENERGY AND UTILISE SLURRY

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ABSTRACT

Lignocellulosic biomass waste, organic household solid waste which have approximately 0.2 billion tons/year and 18.83 million ton/year in Vietnam respectively currently go to the landfill sites. The waste stream was an attractive, renewable feedstock for sustainable production of biogas to utilize as a resource and contribute to reduce greenhouse gas from uncontrolled anaerobic digestion and overcome the overloading situation of existing landfills which are mostly over 85% unsanitary landfills.

In this study, typical biomass wastes from agricultural sector (water hyacinth, cassava residue, pig manure), organic household waste (OW) have been digested and mixed. The results have shown that the agricultural biomass and the OW were pretreated, then co-digested with animal manure to get the mixture having 15% TS, the ratio between substrate and inoculum volatile solid (S/I) was 0.5 -2 (w/w). These input waste streams could produced methane yield from 160 – 320 ml CH_4/gVS and 250 - 400 ml CH_4/gVS, respectively, gas concentration reached 54.4-64 % of CH_4, the reduction of VS ranged from 65.38 – 74.84 %. The batch digestion reactor with simple agitation during 30 minute could produce biogas volume of 1,8 l/ $l_{reactor}$.day, CH_4 ranges 54.4% – 64% with the highest number of 394.95 ml CH_4/g $COD_{removal}$ or 434,4 ml CH_4/g TS and reduction of 98.75 %COD with the organic loading rate of 2.79 g COD/l.day for cassava residue. The biogas is potential resource to use for generators or heating fuel; the liquid digested was utilized as biological fertilizer to improve poor soil or apply valuable low cost for waste water treatment.

Key words: craft village, cassava residue, water hyacinth, organic loading rate, biogas, fertilizer, inoculum

[4-1]

THE STUDY OF "REALIZATION OF SANITARY LANDFILLS OF SUDOKWON LANDFILL SITE"

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ABSTRACT

Recently, according to increase the quality of life, people think that comfortable living environment on health care is necessary. In this interest, Environmental management system is essential for running landfill site.

Sudokwon Landfill Site has a goal to minimize the adverse effects of the environmental pollution of the surrounding areas of Seoul, Incheon and Kyonggi-do region by treating the wastes from the region (Currently 58 cities, counties and districts) in a sanitary and stabilized manner. Sudokwon Landfill Site has been equipped with a perfect sanitary landfill system under the installation standard of waste treatment facilities in compliance with 'regulations on the execution of wastes management.'

In particular, Sudokwon Landfill Site is located in the city of Incheon Metropolitan. it can be even greater symbolism to other people who want to know how operate landfill site in sanitary. This study analyzed and investigated the cases of Sudokwon Landfill site that go through various challenges and overcome successfully.

This study will suggest the knowledge how to realize sanitary landfills with eco-friendly and improve the quality of the environment of surrounding landfills area.

Keywords: Organic Matter, Stabilization, sanitary landfills, eco-friendly, environmental management

[4-2]

STUDY ON THE FEASIBILITY OF COMMUNITY-FUNDED BUSINESS FOR BIOGAS PRODUCTION BY USING QUESTIONNAIRE SURVEY - A CASE STUDY IN TOKACHI REGION, HOKKAIDO

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ABSTRACT

In recent years, the development of renewable energy facilities, e.g., biogas plants, is progressing, aiming at reducing of the environmental problems and carbon dioxide emissions from of livestock farms and building independent decentralized energy systems. For agriculture area in Hokkaido, livestock excrement brings about serious water pollution, odor disamenity and a large amount of greenhouse gas (GHG) emission during the conventional treatment processes. Meanwhile, after the 3.11 Fukushima nuclear power plant accident in 2011, the development local energy sources has receiving great concern. In order to tackle the environmental problems and to develop local energy sources simultaneously, the biogas production by using the livestock excrement has been proposed. Nonetheless, due to the insufficient infrastructure of power systems, e.g., the limited power distribution network, and the high construction/operation costs of biogas plants, only a few biogas plants are considered by the local municipalities. Therefore, considering the property of public goods of energy, this study makes an attempt to exploit the possibility of develop community-funded infrastructure in support of the power distribution of biogas energy, by using the contingent value method (CVM) through a questionnaire survey. A feasible scale of biogas plant construction project is assumed in this study, and part of the required financial budget would be supported by the local company, the municipality and the nearby citizens who could obtain revenue through the investment. In the questionnaire survey, the citizens' attitudes to the development of local biogas plant and their willingness to pay (WTP) on the investment were be investigated. 400 questionnaires were sent by post, and the respondent rate was 27.69%. Afterward, the public value on the promotion of renewable energy development is quantified by CVM. According to the results, the citizens are willing to invest more than half of the required construction cost of the potential biogas plant, and therefore the possibility for developing renewable energy facilities by using the money donations from the residents was confirmed. The outcomes of this study suggest that it is possible to promote the development of biogas plants as independent decentralized energy systems in Tokachi region by introducing the community-funded business. Therefore, the livestock waste problems and the energy demand could be tackled simultaneously.

Keywords: biogas plant, renewable energy, community-funded, questionnaire survey, CVM.

[4-3]

GARUDA SUPER COEFFICIENT: A PROPOSED GREENHOUSE GAS EMISSION FACTOR INMUNICIPAL SOLID WASTE SECTOR FOR INDONESIA

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ABSTRACT

Greenhouse gas (GHG) emission has become one of the most serious and recent environmental issues, in accordance with climate change. Indonesia as one of the most populous countries in the world, approximately produces 142,200 tonnes of municipal solid waste (MSW) daily, with the proportion of organic content up to 50-70 %.

In order to achieve 3rd tier level for submission of greenhouse gas emission report to the UNFCCC (United Nations Framework Convention on Climate Change), countries, including Indonesia, were endorsed to submit their own GHG emission factor. A stoichiometric approach as a mathematical modeling that must be further verified by the experimental approach, was proposed and expected to be the emission factor from Indonesia.

The mathematical model showed organic waste in MSW has the chemical formula of $C_{19}H_{30}O_{11}N$. Through the modeling, it can be showed that 1 kg (wet weight) of mixed MSW was 0.032 kg CH_4 or equal to 0.688 kg $CO_{2(eq)}$. This new emission factor would be proposed in the future as the specific emission factor from MSW in Indonesia, as the alternative method other than common IPCC (Intergovernmental Panel on Climate Change) method. This emission factor was named as GARUDA SUPER (GAs RUmah kaca DAri SUbdirektorat PERsampahan) coefficient, as the name of the institution that developed it, in Directorate of Environmental Sanitation Development, Directorate General of Human Settlements, Ministry of Public Works, Republic of Indonesia.

Keywords: climate change, emission factor, greenhouse gas (GHG) emission, MSW, stoichiometric

[P-1]

A STUDY ON SYSTEM OPTIMIZATION OF SOLID WASTE MANAGEMENT IN JOHOR BAHRU, MALAYSIA

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ABSTRACT
Malaysia has been making great progress in terms of economic growth but the associated expansion of industry and the shift to an urban lifestyle has caused an increase in the quantity of municipal solid waste produced and changes in its physical properties. Most of the waste is still directly disposed of in landfills and landfill capacity in many urban areas is predicted to start to run out in the near future. Furthermore, Malaysia is currently developing a new urban area as part of its green city project, which is designed to support a low carbon society. Therefore, a waste treatment system is required that produces low levels of GHG emissions. In this study, we targeted Johor Bahru city, the center of large-scale development in the Malaysia Iskandar region, and designed and evaluated an optimum solid waste management system. In the first stage, we conducted a waste characterization survey in Johor Bahru and analyzed the properties and characteristics of household waste: physical components, three-component analysis, calorific heat and CHN content. In the next stage, various alternatives for solid waste management were considered involving combinations of waste segregation at the household level, biomass composting, methane fermentation, incineration and final disposal. The design constraints for the SWM system were to reduce the amount of landfill waste and GHG emissions by half. The system optimization goal was to find the lowest cost system.

Keywords: Household waste, Solid waste management, Scenario study, Low carbon society, Malaysia

[P-2]

INTERMEDIATE TRANSFER FACILITY IN INDONESIA

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ABSTRACT
Reducing the handling of solid waste and is part from municipal solid the waste management in Indonesia, according to the Waste Management Law No. 18/2008 and National Regulation of The Ministry of Public Works No. 21 and PRT and M / 2006, based on the concept of waste reduction policies Reduce, Reuse, Recycle (3Rs) as a major concern in planning infrastructure development and waste management facilities Intermediate transfer facility (ITF) carried out based on the 3Rs which was developed to reduce waste before entering the final disposal site, to reduce transportation costs from temporary shelter and extend the life of final disposal site. ITF is an alternative to municipal waste management. The method used is descriptive analysis on the implementation of ITF technology, community participation, and institutional analysis based on interviews and observations This paper presents the implementation of ITF prospects in urban areas in Indonesia, particularly in major and metropolitan cities in an effort to reduce the amount of waste and waste management loads in final disposal site, that be reviewed from the technical aspects of the operational, management and community participation The results of the study in Indonesia ITF type of technology is a dry anaerobic digestion, the digestion of wet organic, composting, treatment organic waste into compost and biogas. ITF management conducted by the private sector, local government and the communities.

Keywords: ITF, Municipal Solid Waste Management, reduce, handling, 3Rs

[P-3]

STUDY ON HEAVY METALS LEACHABILITY OF STEEL SLAG FOR DIRECT UTILIZATION WITHOUT SOLIDIFICATION

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ABSTRACT

Steel slag is a byproduct of the steelmaking and steel refining processes. The main types of slags that are generated from the iron and steelmaking industries are classified as: blast furnace slag (iron making slag) and steel furnace slag. Furthermore, steel furnace slag are classified as: basic oxygen furnace (BOF) slag, electric arc furnace (EAF) slag, and ladle slag. In Indonesia, steel slag is categorized as hazardous waste (waste code D208) from steelmaking industry refers to Indonesian Government Regulation No. 18/1999 jo. No. 85/1999. Steel slag can be utilized according Ministrial Regulations (MoE) No. 2/2008. Steel slag has been used widely as geotechnical construction materials, for instance embankment construction. This utilization must have been scientifically proven safe for the environment. This study aimed to analyze EAF steel slag that will be used as a material for embankment construction, including physical-chemical characteristic, and leachability study. Physical-chemical characteristic that had been test were sieve analysis, spesific gravity, morphology, mineralogy, water content, ash content, pH, volatile content, metal oxides, and heavy metal. Moreover, leachability study that had been test were TCLP (Toxicity Characteristic Leaching Procedure), multiple TCLP, and dynamic leaching test. This laboratory test used four different size of EAF steel slag (0.3-0.6 mm, 0.6-2 mm, 0.212-2 mm, 0.075-25 mm). TCLP test showed all tested metals had complied the government regulation. Moreover, results showed a decrease TCLP concentration for a decrease slag size. Multiple TCLP and dynamic leaching test showed fluctuative concentration for all metals. Generally, leachability test showed small amount of concentration for Ba, Cd, Cr, and Hg that indicated stability of them.

Key words: characteristics, embankment construction, heavy metals, leachability, steel slag

[P-4]

SOCIAL REQUIREMENTS AND LANDFILL SITE STRUCTURE AS SEEN FROM THE CONSTRUCTION CASE OF JAPAN

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ABSTRACT

In Japan, there are many cases of opposition movements by local residents against landfill site construction. Each local government, to deal with these movements, tries to make local residents to agree with the construction and spending long-term negotiation. Also among Japanese society and residents, a low-carbon society and a recycling-oriented society become high demand. Under the above circumstance, each local government is dealing to elaborate on an individual plan and introduce new technologies to negotiate of construction of landfill smoothly with local residents. However, there is no specific way or proposal of landfill structure which both local residents and local government to agree regarding reassurance, safety and environmental conservation.

Therefore we have analyzed contributed landfill systems which have been already installed and contributed to currently operating landfill on the purpose that this report to become a standard guidance to examine " landfill in the future" and " Landfill structure" to solve the above issues.

Keyword: landfill site , statistical data , technology (system/equipment) , social requirement

[P-5]

LARGE MODEL TESTS ON THE BENTONITE MIXED SOIL LAYER UNDERGOING LOCAL SETTLEMENT (Part 2)

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ABSTRACT

In Japan, bentonite mixed soil (BMS) which is made by mixing the bentonite into sand about 10 to 15 % in dry mass in order to have a hydraulic conductivity of less than 10 nm/s is widely used as soil barrier layer of landfill. The BMS layer may experience local settlement of the base ground. In case of large local settlement, the BMS could crack to lose the integrity of the barrier system. The authors constructed six large models of BMS layer in the field which had a thickness of 0.5 m, a width of 1.5 m and a length of 3.0 m. Among them, four models were underlaid with a geonet having a mesh size of 10 mm and different tensile strength. As results it is found that the crack appeared on the bottom surface of the BMS layer at the edge of the cavity and progressed upward at an angle of about 60 degree to the horizon. The models underlaid with geonet had also cracked but did not progress to the top surface while those without geonet had a crack reaching the top surface. It is also found that at the site where the width of crack appeared on the top surface was less than 2 mm an inflow quantity became a little after a few days.

Keywords: Bebtonite mixed soil, Local Settlement, Crack, Geonet, Permeability

[P-6]

IMPACT OF DISSOLVED OXYGEN ON PARTIAL NITRITATION FOR TREATING HIGH AMMONIUM CONCENTRATION FROM OLD LANDFILL LEACHATE

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ABSTRACT

Anammox is a new technology in the high ammonium concentrations wastewater treatment, especially landfill leachate. The transformation of ammonium into nitrogen gas in Anammox often occurs in low oxygen conditions. Partial nitritation - a key stage of the anammox process is also depend on dissolved oxygen concentration. The concentration of dissolved oxygen affects the products of partial nitritation. The air-lift Biofixed-bed reactor with Non - woven Polyester biomass carrier was used in research. In the start-up phase, the controlling operational conditions with pH of 7.9 - 8.3 ; alkalinity 2 – 2.5 gCaCO3 / L ; DO about 1 mg / L ; temperature 29 – 32oC. In operating at 2.0 kg NH4+-N/m3.day, in charge of DO range at 1 ± 0.1 ; 1.5 ± 0.1 ; 2 ± 0.1 ; 2.5 ± 0.1 ; 3 ± 0.1 and 3.5 ± 0.1 mg/L. The results show that in DO 2.5 ± 0.1 mg/L the partial nitritation was achieved. More than 60 % NH4+-N was removal; ratio nitrite/ammonium reached 1.1 and nitrite accumulation about 93 % of (NO_2^--N+ NO_3^--N) in the effluent.

Keywords: Anammox, Partial nitritation, Landfill leachate, Ammonium removal

[P-7]

CHARACTERISTICS OF LANDFILL LEACHATE AND COD FRACTION AT LANDFILLS IN HO CHI MINH CITY, VIETNAM

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ABSTRACT

The paper discusses the characteristics of leachate generated from municipal solid waste (MSW) landfills of Ho Chi Minh City (HCMC), Vietnam. This study aims at serving for the implementation of the best techniques to remove the hazardous components to avoid contamination of aquatic ecosystems. Leachate samples were collected in 2012 – 2014and analyzed for various physico-chemical parameters to estimate its potential pollution. The obtained results showed that the operating landfill leachate are characterized by high concentrations of COD (4213 ± 1074 mg/L), BOD_5 (2686 ± 507 mg/L), total nitrogen (2142 ± 627) mg/L but the concentrations from closed cells at Go Cat landfill were lower than those from 6th cell) still in operation, COD (1916 ± 348 mg/L), BOD_5 (276 ± 52 mg/L), total nitrogen (1148 ± 578 mg/L). Moreover, the leachate had higher concentrations of soluble compounds such as Ca^{2+}, Mg^{2+}, and Cl^-. In addition, BOD_5/COD ratios were very different between operating and closed cells, 0.64 and 0.24, respectively and COD/N ratios were 1.97 and 1.67, respectively. Besides, the leachate from operating cells contained COD fractions such as $(S_S + X_S)/(S + X)$, $(S_I + X_I)/(S + X)$, $(S_S + S_I)/(S + X)$ and $(X_S + X_I)/(S + X)$ in rations equivalent to: 0.94, 0.06, 0.75, 0.25, respectively and closed landfill are 0.37, 0.63, 0.76, 0.24, respectively. This can have drastic effects on the choice of treatment process for leachate.

Keywords: leachate, landfill, nitrogen, COD, characteristics.

[P-8]

A FUNDAMENTAL STUDY ON THE MODELING OF SOLUTE TRANSFER BETWEEN MOBILE AND IMMOBILE REGIONS OF PORE WATER IN A SOLID WASTE LAYER

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ABSTRACT

In solid waste landfill management, the prediction of landfill stabilization and leachate quality is of importance. It is known that the pore water in a solid waste layer consists of mobile and immobile regions, and water and solute transport models in which pore water was divided into these regions were proposed. However, a practical method to quantify the mass transfer coefficient between mobile and immobile regions used in the models has not been established yet. This study is a fundamental study to establish a model to estimate the mass transfer coefficient between mobile and immobile regions of pore water in a solid waste layer. In this study, on the assumption that a pore network in a solid waste layer consists of various pipe sizes, numerical simulations of water and solute transport at a section of a landfill, where mobile and immobile regions of pore water were connected, were carried out to grasp the influences of affectors such as the shape of mobile and immobile regions of pore water on the mass transfer between these regions, and based on the numerical simulation results, a model that shows the relationship between the mass transfer coefficient and its affectors was proposed.

Keywords: Solid Waste Landfill, Pore Water, Mobile and Immobile regions, Mass Transfer, Modelling

[P-9]

ANALYSIS OF LONG-TERM DATA FOR STABILIZING THE WASTE BY COMPARISON BETWEEN AN OPEN SYSTEM LANDFILL SITE AND CLOSED SYSTEM DISPOSAL FACILITIES

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ABSTRACT

This study analyzed extensive field data related to waste stabilization over a period of 10 years, including temperature within the waste layer and the quality of landfill waste based on an elution test, for real closed system disposal facilities (CSDFs), which are landfill sites with roofs, and the more widely used open system landfill sites (OSLSs). The objectives of this study were: 1) to clarify the role of artificial watering during landfill waste stabilization in CSDFs and 2) to compare the degree of landfill waste stabilization in CSDFs and an OSLS in term of the volume of water required for waste stabilization. The results show that watering is necessary for landfill waste stabilization in CSDFs, based on a comparison of the waste quality in CSDFs with and without watering. Watering contributed more to the removal of pollutants by washing compared with biodegradation in CSDFs. The results of the elution tests using waste sampled from CSDFs and an OSLS showed that there were decreases in the total organic carbon and chloride ion concentrations over time after landfill, whereas there were no differences in the elution test results between the CSDFs with artificial watering and the OSLS with natural precipitation. Based on our analysis of long-term field data, this study suggests that the volume of water required to stabilize waste can be reduced significantly in CSDFs, thereby decreasing the cost of leachate treatment compared with OSLSs.

Keywords: closed system disposal facilities, long-term field data, waste stabilization, watering

[P-10]

EVALUATION OF CO_2 EMISSIONS AND THE RENEWAL PROCESS OF LANDFILL SITE BY DIGGING

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ABSTRACT

Construction of landfill site is becoming difficult by the social issues and environmental problems. In Japan, incinerator ash has become main landfill of waste. It is known that some of incineration ash, soil waste and combustible waste are recycled into cement resource or molten slag as artificial sand. Therefore, by digging up and recycling landfill waste, it is possible to re-produce the landfill site in which capacity become full.

In this study, we examined the renewal systems by two methods of cement recycling and molten slag. And in order to evaluate the impact on the environment, we evaluated CO_2 emission that is the amount required to produce a disposal space of 1 ton. Percentage of ash in landfill waste was assumed to 50% from 30%.

In results, in renewal system by cement recycling, total of CO_2 emissions were evaluated in range of 208–50 kg-CO_2/ton. CO_2 emissions were found to decrease with an increase in the percentage of ash. In renewal system by molten slag, total of CO_2 emissions were evaluated to 534-548 kg-CO_2/ton. When comparing the renewal system these methods, CO_2 emissions by cement recycling were found to be much lower than that by molten slag.

Keyword: landfill, renewal, cement recycling, molten slag, CO_2 emission

[P-11]

EVALUATION OF BIOCHAR, PRODUCED BY PYROLYSIS OF VARIOUS BIOMASS RESOURCES, AS SOIL AMENDMENT MATERIAL FOR WATER RETENTION

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ABSTRACT

Biochar (BC) is created by the pyrolysis of biomass resources and is generally used as a soil amendment material. The physicochemical properties of BC differ depending on feedstock and pyrolysis conditions. In this study, we evaluated efficiencies of BC as soil amendment material for improving soil water retention. Sewage sludge, poultry manure, rice husk, sugarcane bagasse, woodchip (cedar and cypress), and Moso bamboo chip were pyrolyzed at 400, 600 and 800 °C with a retention time of 2 h. The water repellency index and pore size distribution of BC were measured. The water repellency indexes of BC formed from sewage sludge, woodchip (cedar), and sugarcane bagasse at 400°C were high. As the pyrolysis temperature increased, the water repellency index decreased. Pore volumes of BC derived from sugarcane bagasse, woodchips and poultry manure were larger than that dreived from other feedstock. Consequently, BC derived from sugarcane bagasse, woodchips and poultry manure, which formed at a higher temperature, could be a suitable soil amendment material for enhancing soil water retention.

Keywords: Biochar, Pyrolysis, Waste biomass, Soil amendment

[P-12]

UTILIZATION OF HTC (HYDROTHERMAL CARBONIZATION) PRODUCT FROM WOOD WASTE

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ABSTRACT

HTC (Hydrothermal carbonization) is a highly effective technique for treating various shapes and moisture content levels of organic waste (e.g. sludge, MSW(Municipal solid Waste), food waste etc.). The HTC process can produce gaseous, liquefied and solid products. In this study, construction wood waste, which had low moisture content (≥5%), was used for feedstock. Water was added to the feedstock to raise moisture content to 80%. Feedstock was cut less than 1cm and processed for 15 ~ 120 minutes at a temperature range of 200℃- 280℃.

After the reaction, the wood waste was converted into a dark colored solid. This end product contained organic nutrients and had over 6,000 kcal/kg HHV (Higher heating value). From this fact, the solid product can be considered bio-char or biocoal. The liquid by-product's organic acids were analysed by the gas chromatography mass spectrometry (GC-MS) and the liquid chromatography (LC). Also, minor amounts of FAME (Fatty acid methyl ester: Biodiesel) were detected.

These results indicate that the HTC process is great technology which can produce useful solid product as well as liquid product.

Keywords: HTC(Hydrothermal carbonization), Solid biofuel, Biochar, Wood waste, Organic acid

[P-13]

INVESTIGATIONS INTO THE QUANTITY AND COMPISITION OF PRODUCED DENTAL SOLID WASTE IN ISFAHAN CITY

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ABSTRACT

Aims: In most dental clinics of the developing world**,** the management of dental waste is a significant problem. For appropriate waste management approaches, identification the amount and composition of solid waste is necessary. The purpose of this study was to investigate the composition of dental waste coming from six dental health services in Isfahan, Iran.

Materials and Methods: From 45 public dental clinics in Isfahan, six public dental health services were selected (three dental clinics and three dental centers). Waste collection took place from October to December 2012. During this period, three samples were collected from each dental clinic and were divided to pre-determined groups manually.

Results: In dental centers, the amount of infectious, non-infectious and domestic-type waste accounting for 45.07%, 12.15% and 42.78%, respectively. Whereas in dental clinics the production rates of infectious, non-infectious and domestic-type waste accounting for 52.2%, 8.58% and 39.22%, respectively.

Conclusion: Overall, according to the results it can be said that integration of infectious and hazardous waste with general waste leads to the amount of infectious waste appears much greater than it actually is. The collection and disposal of amalgam and other hazardous dental solid waste should be regulated as soon as possible and to decrease the costs of dental waste management the uncontaminated recyclable items, which contained approximately 33% of total dental waste should be recycled or reused if possible.

Key words: Amalgam, dental clinics, dental solid waste, infectious waste, solid waste management