



NEWSLETTER

No.73

This Newsletter is published four times a year, e-publication only.

September 2010

JAPAN SOCIETY OF MATERIAL CYCLE AND WASTE MANAGEMENT

**Japan Society of Material Cycles and Waste Management (JSMCWM):
Its Future as a Scientific Specialist Group**

Present status of JSMCWM

I have been selected as the 11th President of the Japan Society of Material Cycles and Waste Management (JSMCWM). It is now 20 years since the Society was established in 1990. At that time in Japan, illegal dumping of waste and dioxin formation during incineration were the main social issues concerning waste management. I called the situation “The time to counter destruction by waste with hope for establishing material cycle societies”.

Time has passed, and, in 2009, we changed the name of the Society from “Japan Society of Waste Management Experts (JSWME)” to “Japan Society of Material Cycles and Waste Management (JSMCWM)”. By doing so, we wished to indicate that the Society had to broaden its perspective to cover resource conservation and greenhouse-effect issues in addition to the original issue of waste management. At the same time, the Society was re-organized as a corporate body, so further transparency in financial affairs and proper management of the Society are required.

Three key operation policies for the 11th term

The basic policies of the Society during the 11th term will be 1) further reinforcement of its academic foundation, 2) collaboration with interested parties from various fields, and 3) fostering its financial basis by pursuing public-information strategies.

1) Further reinforcement of its academic foundation

Academic societies are places where one can present one’s research results to examine and discuss their scientific validity in an open manner. We are therefore required to build up an academic foundation that is as solid as possible. In June 2010, the Journal of Material Cycles and Waste Management (JMCWM), the official English-language journal of the Society, acquired an impact factor (IF), an acknowledgment of the steady publication of results over the period of 10 years since 1999. However, we must make efforts to improve the IF in order to gain a high reputation. In the



present computerized age, it is also essential to introduce electronic systems for handling the submission and reviewing of scientific papers. In addition, the Society has to put forward its own research projects and bring the results to the attention of the public.

A funded research project sponsored by the Ministry of the Environment in 2009, “Project to study methods of monitoring industrial waste”, was an excellent example of such a project. Establishing testing methods and standards for recycled products will be a socially important role of the academic society as a scientific specialist group for waste management and resource recycling, so that this project has the potential to promote the development of these fields.

2) Collaboration with interested parties from various fields

Collaboration with related bodies from various fields is indispensable for tackling issues of waste management and material recycling, because these issues are intricately related to various fields. During the 11th term, we will promote a cooperative approach within various resource-recycling fields such as metal refining and cement manufacturing, while maintaining a strong relationship with waste management partners. Needless to say, international relations are also important. Above all, it is essential for us to deepen our commitment to the Asian region. Our cooperative relationship with the Korea Society of Waste Management (KSWM) has been enhanced through the collaborative editing of the English-language journal, JMCWM. But we must also consider the importance of our relationship with other Asian countries, so we will be supporting activities concerning the Society of Waste Management Experts in Asia and Pacific Islands (SWAPI). We will also maintain our good relationship with citizens and continue to issue “3R in Everyday Living - keeping one step ahead of waste”, a magazine which is edited by a grass-roots group.

3) Fostering its financial basis by pursuing public-information strategies

We have planned and held various lectures and workshops, and some of them were quite successful. But I do not think that the advertising for them has generally been adequate. Planning and drawing up roadmaps at an early stage is vital for the development and enhancement of public-relations campaigns, and we will do our best in this regard. Many academic societies in Japan are facing financial difficulties. We must use enhanced public-relations campaigns to build a strong financial base. As well as this, we will re-examine the present membership system and seek more flexible ways to increase the numbers of both individual and supporting members.

The Society must move forward with flexibility and high-quality expertise

Lastly, we deeply appreciate our senior associates who have built up the base of the organization and the governing structure of the Society over the past 20 years. However, since the beginning of the 21st century we have been faced with financial difficulties and have been overwhelmed with huge amounts of information. We must not be alarmed by this situation, but must try our best to further develop the Society while adhering to the basic principles established by our senior associates. As the 11th president, I will do my best to run the Society with social rationality, maintaining its good points as a scientists' community and a journal community that will not be exclusive to experts and that will not deviate from the openness that society expects of it.

(Shin-ichi Sakai)



Author: Even though we have cars, refrigerators and plumbing, they're all pointless if we don't have fuel, food and water.

18th Session of the UN Commission on Sustainable Development -- International Expansion of 3R

This year the 18th Session of the United Nations Commission on Sustainable Development (CSD-18) was held at UN Headquarters in New York on May

3-14. The Commission is responsible for reviewing progress in the implementation of the Agenda 21 framework, adopted at the Earth Summit (1992, Rio de Janeiro), and added waste management (hazardous & solid waste) along with chemicals, transport and mining to the 2010-11 thematic targets for the 10-Year Framework of Programmes on Sustainable Consumption and Production Patterns.

The 3R initiative, which aims to form a sound material cycle society through the 3Rs (reduce, reuse and recycle), was proposed at the G8 Summit held in the United States June 8-10, 2004 (Sea Island Summit) by then-Prime Minister Junichiro Koizumi. Beginning with the Ministerial Conference on the 3R Initiative held in Tokyo in April 2005, and the formulation of the Kobe 3R Action Plan at the G8 Environment Ministers Meeting, (Kobe, Japan) in May of 2008, progress has been made in efforts to establish an international layer to developments.

CSD-18 included ministerial level talks held the 12-14th, as well as a side-event hosted by the Government of Japan on the 14th titled "Strategies for Sustainable Chemicals and Waste Management -- Toward a Global Sound Material Cycle Society".

The side-event introduced results of (1) The Inaugural Meeting of the Regional 3R Forum in Asia and (2) The International Consultative Meeting on Expanding Waste Management Services in Developing Countries, as well as Japanese initiatives in the field of waste and 3R.

(1) Inaugural Meeting of the Regional 3R Forum in Asia

Given the importance of promoting the 3Rs in Asia's developing countries, the Regional 3R Forum in Asia was formally launched in November 2009 with the participation of representatives from 15 Asian countries, in addition to various international organizations and 3R experts. The forum aims to promote high-level dialogue between governments, to assist the implementation of participants' 3R projects, to encourage the exchange of knowledge and experience with implementation of 3R policy tools, and to corroborate the effectiveness and benefits of 3R implementation. (For details, see the previous newsletter)

(2) International Consultative Meeting on Expanding Waste Management in Developing Countries¹ (see photo)

¹<http://www.unccd.or.jp/env/docs/Draft%20Aide%20Memoire%20and%20Programme-WM%20Meeting-web.pdf>



This meeting was held in Tokyo on March 18-19th, co-organized by the Japanese Ministry of the Environment, UN Department of Economic and Social Affairs (UN/DESA), and UN Center for Regional Development (UNCRD). It was attended by nearly 100 guests from 21 countries in Asia, Oceania, Europe, and South and North America, as well as 9 UN agencies and international groups. Proposals were made as follows:

(1) With the large number of issues stemming policy and institution, financial and technical aspects, it is necessary to form a new global partnership to assist the efforts of local communities. It is also necessary to change overall awareness of waste-related issues and of the connection between efforts at the stages of production and consumption and measures to counter the generation of waste. 2) It is important to build organizational frameworks for waste management to strengthen legal and policy aspects. 3) It is important to integrate both resource and waste issues into waste management. Strategic planning at the national level is necessary, such as Japan's efforts toward a sound material cycle society. 4) It is necessary to expand efforts like the Regional 3R Forum in Asia to other regions.

At the Ministerial Thematic Roundtable, "Strategies for Sustainable Chemicals and Waste Management," Japan stepped up its efforts on 3R policy by emphasizing the importance of establishing social practices that clarify responsibility and cost burden for waste disposal and recycling, and to improve legal systems based on such concepts as the Polluter Pays Principle and Extended Producer Responsibility.

Based on these discussions, the Chair's summary of CSD-18², reported that 3R promotion is serving as a comprehensive waste management policy in a number

² http://www.un.org/esa/dsd/resources/res_pdfs/csd-18/Chairs_summary.pdf

of countries, that region-based initiatives--such as the Regional 3R Forum in Asia--should be encouraged and that it is necessary to build up experiences with 3R to implement appropriate waste management approaches in developing countries.

Japan is further pronouncing its contribution to the CSD process by holding an International Consultative Meeting on Expanding Waste Management Services in Developing Countries early next year in Tokyo to provide input for CSD-19.

Further Actions

Ministry of the Environment (MOE) Japan is committed to contribute to CSD by:

- (a) hosting a follow-up meeting in January 2011 as an input to CSD-19**, in close collaboration with UNDESA, UNCRD and IGES.
- (b) developing the Regional 3R Forum in Asia** to share with other regions, and
- (c) extending ODAs to support developing countries** for 3R and integrated waste management.

(Figure: Japan's "Further Actions" slide at the side event)

As Japan proposed at the G8, the 3R approach has played a central role in the G8 nations and the Asia-Pacific region, and with discussion among nations around the world in the context of Agenda 21 taking place, there are expectations that the ideas will catch on and continue to gain traction.

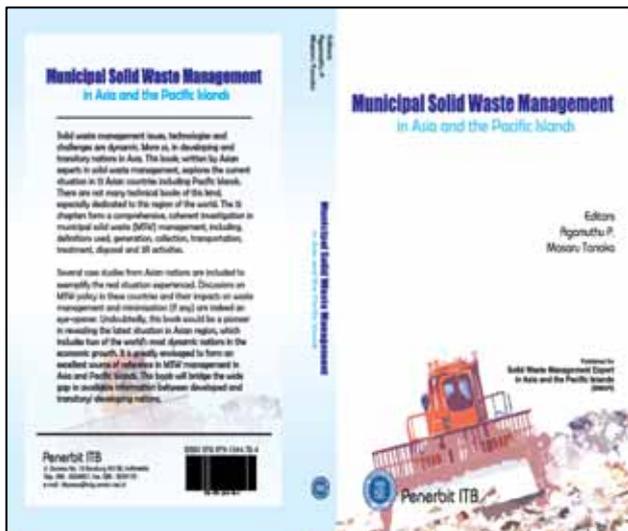
(Hiroki Hashizume)

Municipal Solid Waste Management in Asia and the Pacific Islands

The current need to improve global living standards increases the pressure to manage the consequences of doing so. The population explosion has a great influence on this occurrence. One of the primary concerns to mankind is the exponential generation of waste. Where there is production or improvement, there will be waste generated. However, the challenge is to redefine waste as a product, in such a way that it is possible to reduce the total amount of waste. In order to archive significant levels of reduction, waste is organized and reconstructed into a manageable system. Waste management plays an imperative role in the success of the whole system, from the cost and savings to the benefits. Municipal solid waste management (MSWM) has been and will continue to be a major issue facing countries worldwide. This holds particularly true for developing countries, where the total amount of municipal solid

waste (MSW) has increased dramatically due to rapid industrialization and increasing urban population. Meanwhile, with limited resources, only basic technologies for treatment and disposal and scarce enforcement of pertinent regulations remain a dilemma to MSWM in developing countries, resulting in the focus being directed toward safe disposal and recycling of MSW. Solid waste management issues, technologies and challenges are collectively dynamic. Proper management and carefully selected technologies applied at their fullest will reduce the challenges in the future.

This book (*Municipal Solid Waste Management in Asia and the Pacific Islands*) caters to the major importance of management, taking a specific angle and widening the perception. Municipal sources can be assumed to be the most diversified “single source” of waste production. Thus, managing these wastes can be truly challenging. Municipal wastes vary between countries and regions. Here, the collective experiences of distinguished authors from the Society of Solid Waste Management Experts in Asia and Pacific islands (SWAPI) came out with related issues concerning Solid Waste, especially in account of the Asia and Pacific Islands region.



The authors are collectively from 13 Asian countries, including Pacific Islands, and are experts in solid waste management. They explore the current situation by putting forth their standpoint on different areas of Municipal Solid Waste Management based on specific examples in their countries. There are chapters concerning Bangladesh, Cambodia, China, India, Indonesia, Japan, Nepal, Malaysia, Pacific Islands, Philippines, Sri Lanka, Thailand, and Vietnam. SWAPI became interested in the publication as a means to educate and provide a clear and precise overview of the current municipal solid waste

management practices and technology in Asia and Pacific Islands. The 15 chapters form a comprehensive, coherent investigation into common definitions, generation, collection, transportation, treatment, disposal and 3R activities.

The book starts off with the first chapter on Sustainable Society and Municipal Solid Waste Management by Masaru Tanaka. The discussion is skillfully focused on the current major environmental crisis and ways to create a recycling society, in addition to discussing strategies of solid waste management. In another chapter, the authors Agamuthu, P., Fauziah, S. H. and Khidzir, K. M. discuss challenges and issues specific to sustainable 3R practices in Asia and the Pacific Region. Taking into account the current 3R practices in the regions provides a better understanding of the main concerns and ways of dealing with them. In the following chapters, the MSW management systems are given from the perspective of each country. Much emphasis is given to the current management system; Reduce, Reuse, Recycle (3Rs); legal frameworks; current policies; issues and future developments. This book portrays these systems and how they are adapted in different countries, giving interested readers an idea of how to apply such systems in their own country or region. Major concerns are emphasized, such as management systems, applicable lawful frameworks/policies and the best future planning, for readers to evaluate. The list of authors are: Masaru Tanaka, Agamuthu P. *et al*, Tariq Bin Yousuf *et al*, Sour Sethy, Chai Xiaoli and Zhao Youcai, Kurian Joseph, Enri Damanhuri and Widhi Handoko, Masaru Tanaka *et al*, Surya Man Shakya and Bhushan Tuladhar, Albert Magalang, Basnayake B.F.A. and Visvanathan C., Orawan Siriratpiriya and Suphasuk Pradubsuk, Thi Kim Thai N., and last but not least, Esther Richards.

Quality technical books of this kind are a rarity, especially those dedicated to this particular region of the world. Several case studies from Asian nations are included to exemplify the real situation on the ground and give readers a clear perspective. Discussion on MSW policy in these countries and its impact on waste management and minimization, if any, is indeed an eye-opener. Exploring the various approaches taken by different countries offers a look at diversified ways to manage MSW in what amounts to a virtual “culture exchange” aimed for improvement. Undoubtedly, this book is groundbreaking in its success to clarify the latest situation in the region, which includes two of the world’s most dynamic nations in terms of economic growth. This book is an

excellent reference source for MSW management in Asia and Pacific Islands. It goes to great lengths to fill the wide gap between information available on transitory/developing nations and that on developed nations. With this resource, one is able to make important comparisons, and select constructive mechanisms to be applied in the future.

A book is like a garden carried in the pocket.
~Chinese Proverb

(Agamuthu Pariatamby)

The Hanoi 3R Movement

The volume of solid waste generated in urban areas year to year is increasing due to rapid modernisation of industries and urbanization, as well as the diversity of lifestyles in Hanoi City. As a result, problems have emerged concerning the rising cost of waste management and securing landfill sites. Furthermore, the administrative boundary of Hanoi city was expanded in August 2008, making the total area of Hanoi 334,470.02 hectares; at the same time, the population has doubled to 6,232,940 people, greatly accelerating the increase in the amount of waste generated. The Nam-son landfill site, which is used to dispose of waste coming from Hanoi City, is predicted to be full by the year 2012. Therefore, reducing the generation of waste has become an urgent issue.

Under these circumstances, the Government of Vietnam and the Government of Japan agreed on a joint project called, “The Project for Implementation Support for 3R Initiative in Hanoi City to contribute to the Development of a Sound Material-Cycle Society in the Socialist Republic of Vietnam” (abbreviated as the 3R-HN Project). The three-year project was launched in November 2006 with the technical assistance of the Japan International Cooperation Agency (JICA). It aimed to realize a “Sound Material-Cycle Society” in Hanoi City by introducing 3R actions such as waste separation at the source, composting of organic waste under the concept of “3R”, elimination of plastic shopping bags, and so forth. The major stakeholders are the Hanoi People’s Committee (HPC) in charge of policy-making, the Hanoi Urban Environment Corporation (URENCO) in charge of the actual operation of solid waste management, and the citizens of Hanoi. During the development of the project, a pilot project on source separation and environmental education were conducted in four model wards with a total population of about 72,800. In tandem with those activities, a

series of social marketing activities were also carried out to disseminate information and raise the awareness of residents.

Public Relations Activities

The project had extensive components for public relations and environmental education activities because Hanoi citizens' active cooperation and participation in the project activities are essential to realize the aims. In the initial stage, a basic policy was decided to apply a “participatory approach” to public relations activities, of which various types were implemented.



Project Logo



Project Panel

The project provided various events and workshops to encourage the stakeholders to enhance their sense of participation. Also, the project made efforts to organize citizens’ groups which support 3R and the project’s activities. As a result of these activities, four organizations, *3R Stars*, *3R Supporters*, *3R Volunteers Club* and *3R Partners* were established to support the 3R-HN project. These groups made up of Hanoi citizens made a significant contribution to the introduction and expansion of 3R initiatives in Hanoi.

3R Stars

3R Stars is a group of major stakeholders which include HPC, WPC, residential group leaders, staff of URENCO, academics, foreign donors and other supporters. The project hosted meetings twice a year to promote their communications and activities. Through the meetings, members of the 3R Stars

discussed the waste issues in Hanoi and contributed to support development of the 3R policies and strategies. Based on the 3R Stars activities, the “3R-Declaration” was published by the Vice Mayor of Hanoi city in March 2008, in which Hanoi commits itself to the introduction of 3R.

3R Supporters

3R Supporters is an association of residential group leaders who support at-source separation in the community. They are organized under the ward committees of the project model area. Their major activities are explaining 3R activities to fellow residential group members and overseeing the waste collection points.

3R Volunteers Club

3R Volunteers Club is a group of students from universities and high schools in Hanoi. On the 1st of December 2007, the project supported the organization of the first meeting of the 3R Volunteers Club with about 100 members, where the volunteers voted for their management board and discussed potential activities. The club operates as an independent organization. By September 2009, 3R Volunteers Club had more than 300 members. Their main activities are to support the activities of the 3R-HN Project. The 3R Volunteers Club has joined and supported various environmental events in Vietnam, such as the Eco-Product International Fair, AgroViet, Green Week, Hoi An Festival, etc. The 3R Volunteers Club members also patrol collection points, hold “3R mobile cinema events”, and carry out environmental education programs at several universities, primary schools and street events. Even after the project completion in November 2009, 3R Volunteers Club continues to actively carry out such activities.

The main characteristic of the 3R Volunteers Club is that its activities are sustained by its members’ motivation and determination. Young and eager students have had tremendous influence over fellow residents of Hanoi City, and their activities have been widely reported by the mass media.

3R Partners

3R Partners is an ambitious organization established with the support of the 3R-HN Project aiming to involve 10,000 registered members. The project regards contributions of the 3R Partners as vital to realize the aims as they have the ability to change the perception of waste in Hanoi through 3R actions. 3R Partners works on a membership system, in which every individual, community, organization, NGO, or

company can take part. Any person who wants to contribute to environmental issues is a potential 3R Partner. Up to the end of 2009, the number of registered members was nearly 6,000.

3R Partners have also organized a number of workshops and events to disseminate 3R and support the 3R-HN Project. In March 2007 they implemented the first flea market in Vietnam. For the event, many participants collected usable old items (clothes, tools, furniture, etc.) to exchange with others. At the end of the day, they donated the remaining products to charity groups. Through this activity, 3R-Partners and the 3R-HN Project promoted the concept of “Mottainai” (a word meaning *frugality* in Japanese) and 3R activities. In 2008 and 2009, they organized a “Mottainai Fair” 3 times. At these events, approximately 15,000 Hanoi citizens participated, and the popularity of the flea market concept is growing in Hanoi City. In May 2010, a “Mottainai Fair” was organized by 3R Partners led by the 3R Volunteers Club and carried out by its own initiative.

By supporting these organizations, the project intended to create a social movement for the 3R activities among Hanoi citizens.



3R Volunteers Club activity at school



Mottainai Fair

Result and Future Development of 3R-HN Project

As a result of the project activities, 3R and at-source separation were widely disseminated in Hanoi. The 3R-HN Project changed Hanoi citizens' perception of

solid waste management from being a dirty and unclean activity to one that is cool and stylish; this is necessary because changing people's perspectives and behaviours toward waste is essential for the success of source separation and 3R actions.

In Viet Nam, many local governments are trying to introduce at-source separation in line with the government Decree No. 59/2007 which stipulates "waste segregation and recycling". However, there have only been a few successes so far. Therefore, waste management officials highly anticipate the "Hanoi-model source separation" introduced under the 3R-HN Project will be expanded throughout the country. Already, 3R-HN implemented by JICA has been receiving numerous inquiries from other cities in Viet Nam.

(Hisashi Yamauchi)

Korea Society of Material Cycle and Waste Management Participation Report

On May 13th, the Korea Society of Waste Management held a Korea-Japan Special Symposium at the 14th Korea-Japan Joint International Session. The symposium was held at Hanab National University in Daejun, about an hour from Seoul by KTX. Daejun, known as an academic town for its numerous research institutes, was the host city of the symposium four years ago as well.

At the outset, there was a hybrid poster session, much like the one held in Japan last autumn. With 33 presenters, 19 were from Japan. Presentations covered a wide range of topics such as incineration and recycling, but there seemed to be many on the topic of using incineration to create biomass gas. The short presentations were handled expertly and well prepared.

Afterward, the special symposium was held on the theme of Korean and Japanese MSW recycling strategies in metropolitan areas. From Korea, Myung-Su Yu of the Ministry of Environment presented "Resource Recirculation Policy in Korea", and Jin-Woo Yang of the Busan Development Institute presented "Food Waste Management and Tasks Policies in Busan Metropolitan City". From Japan, Minoru Sawachi of Ex Corporation, and a former technical advisor to Osaka City, presented "Facilitation Factors on Citizen's Cooperation in Implementation Process of Urban Waste Management Policies - Factor Analysis of Big Cities in Japan and Factor Inference in Korea". Also, Wakana Takahashi of Utsunomiya University presented "A Comparison of 3R governance of Japan and Korea - What brought the differences of 3R policies between Nagoya City and Busan Metropolitan City".

Myung-Su Yu spoke of the increase in the amount of wastes since the year 2000 and the need for a material cycle policy due to the sharp rise in cost for materials from a limited number of countries. There used to be a focus on waste reduction, recycling and treatment in order to prevent waste pollution, but there has been a paradigm shift due to concern over material depletion and climate change toward efficient production and consumption which is encouraging recycling, energy recovery and advanced treatment methods. As a policy, there have been a variety of measures such as RDF and generating biogas fuel from waste, energy recovery from waste incineration and improving the recovery rate of precious metals.

Jin-Woo Yang explained the current situation of waste treatment and disposal in Busan, and the waste reduction plan there. Household waste is separated into burnable, non-burnable general waste, foodstuffs, and recyclable materials, where foodstuffs are collected in a separate container and taken to a facility where it is composted or used for waste heat. Furthermore, it was shown that the effect was greater when the reduction plan called for a 10% reduction below 2008 levels by 2012.

Minoru Sawachi compared and contrasted the waste management policies of Nagoya, Yokohama and Osaka cities. Since Nagoya City was unable to construct a landfill, a stronger container recycling law was sought to reduce waste instead. Yokohama City is promoting a waste reduction policy called G30, to reduce waste generation levels by 30% by 2010 compared to 2001 levels. Each of these was compared to waste reduction in Osaka City where it was understood that citizen cooperation played a large role in reducing waste.

Wakana Takahashi divided policies in Japan and Korea into four stages. A comparison of GDP in the two countries along with Stage 1 (public sanitation), Stage 2 (waste treatment through regulation and environmental law), Stage 3 (recycling), and Stage 4 (policy for a material cycle society) showed the shift to stages 3 and 4 during periods when GDP was low. A comparison of the effects of 3R policies in Nagoya, Japan and Busan, Korea was given, complete with background, policies and the effects of reduction and recycling. In Japan, citizen cooperation was seen as a large factor whereas Korea carried out policies in a top-down fashion.

(Akio Suzuki)

International events information

November 4-6, 2010

JSMCWM21th Annual Conference

<http://jsmcwm.or.jp/international/event.html>

November 8-11, 2010

**IWWG International Waste Working Group
3rd International Symposium
on Energy from Biomass and Waste**
<http://www.venicesymposium.it/>

**Material Cycles and Waste Management Research
Vol. 21, No.1 (January, 2010)**

Preface

***Japan Society of Material Cycle and Waste
Management in the Year 201X***

Toshihiko Matsuto

Special Issues: Waste Biomass Utilization --- Current
State of Legal System and Technology for Promotion
of Utilization.

***Policies and Measures to Promote of Waste Biomass
Utilization***

Yoshio Nakura and Hisashi Kudo

Current Status of Biomass Energy Utilization

Takahiro Miura

***Significance and Future Perspective of Biomass
Utilization***

Kinya Sakanishi

***Challenges for the Efficient Utilization of Biomass
Energy***

Mikako Kokitsu and Jun Tsubota

***Current State of Waste Biomass Utilization and
Regional Technology Research in Local
Governments***

Kazuo Nakamura

Report on the 21st Annual Conference of the
JSMCWM

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Reports from International Session

Reports from Planning Session by EXCO

Activity Reports from the Regional Chapters

***Report on the Seminar for Citizens and Students by
the Kansai Regional Chapter***

**Journal of the Japan Society of
Material Cycles and Waste Management
Vol. 21, No.1 (January, 2010)**

Paper

***Study on a Convenient Method for Monitoring
Hazardous Gas Based on Methane Determination***

during Waste Excavation at Reclamation Sites

Noboru Tanikawa, Toru Furuishi, Kazuei Ishii and
Kenji Iwasaki

***Obstruction of Mesophilic Non-dilution Methane
Fermentation Processing from Results of Microbial
Consortia Analysis***

Akinobu Nakamura, Toshihiro Hoaki, Daisuke
Tanikawa, Tomohito Katahira, Takashi Yamaguchi,
Hiroyuki Imachi Akiyoshi Ohashi and Hideki Harada

***Dehydrochlorination of Polyvinyl Chloride Using
Amine Additives***

Fumio Osada and Kazuyo Nagai

***Analysis and Estimation Model for Municipal Solid
Waste Landfill Costs***

Toshihiko Matsuto and Keisuke Ohara

***Preparation of Solid Fuel from Waste Polyurethane
through Thermal Treatment with Used Vegetable Oil***

Yoishi Kodera, Tatsuzo Honda and Shigeru Tasaka

Current Members of JSMCWM as of July 31, 2010 (The figures in parenthesis indicate the difference from June, 2010)		
Regular Members	2,606	(-5)
Students	230	(-3)
Non-Japanese Member	86	(2)
Public Institutions	94	(1)
Supporting Members	121	(0)
Individuals of NPOs	6	(0)
Total	3,143	(-5)

NEWSLETTER NO.73, September, 2010

Published by: Prof. Shin-ichi Sakai, President,
Japan Society of Material Cycle and Waste Management
Edited by: Prof. Hidetoshi Kitawaki, Chairman,
International Relations Committee
Edited by: Tsunako Matsumoto, Yuko Aoki
Translation and Design: Kokusai Kogyo co. Ltd.

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