NEWSLETTER

No.82 *This Newsletter is a quarterly e-publication.* **January 2013**

JAPAN SOCIETY OF MATERIAL CYCLES AND WASTE MANAGEMENT

Contents

An information hub for waste management and material cycles

First, I would like to wish all of you a happy New Year. The Japan Society of Material Cycles and Waste Management (JSMCWM) has expanded its scope of activities since 2008 when it became incorporated after adding material cycles to its former name, “Society of Waste Management”. Last year’s Great East Japan earthquake and tsunami and the resulting enormously challenging issue of disaster waste disposal highlighted the importance of waste management. Our society provided affected local governments with technical support in dealing with the disposal of their disaster waste. Subsequently, in July 2011, we published the manual “strategy for disaster waste separation and treatment”. Disaster waste is not just caused by earthquakes and tsunamis, it is an issue every year after typhoons and storms. The manual is intended to be a basic overall framework for treating possibly vast quantities of disaster waste that may contain hazardous substances. We are focused on disseminating information that is first and foremost useful and practical. We hope it can be a valuable resource for local governments and so on that need to develop plans and policies for disaster contingency planning.

Last year a law for promoting the reuse and recycling of small electrical devices was passed by the Japanese Diet and will come into effect in 2013. It is the first law that actively promotes the collection of recyclable resources, and local governments are expected to take a leading role in its implementation. With regard to the 3Rs, because the limitations of recycling have become apparent as such activities have progressed, the importance of a 2R approach has become clear. This calls for the dissemination of concepts about societal mechanisms such as lease and rental of products that the manufacturer has continued responsibility for after their use, and product sharing systems. As a society also, I hope we can contribute to spreading such innovative ideas.

Over the last few years the society has been working to compile and disseminate methodologies that are basic to the academic disciplines of waste management and material cycles. For example, revision of methods of inspecting industrial waste and methods of measuring radioactivity of waste (both contracted by the environmental ministry), and methods of analyzing rare metals contained in used products. The development of such methodologies that can be used in the management of hazardous wastes and for evaluating policies regarding municipal solid waste and material cycles is an issue that should be undertaken by a society of experts; therefore we intend to actively disseminate the results of our investigations.

BRICs and Asian countries are experiencing rapid economic growth, on a much more rapid scale than that experienced by Japan during its period of high economic growth, therefore the associated waste management issues will be of concern both in terms of volume and quality. In recent years the material-cycles sector has become more international. One issue of concern is the transborder movement of hazardous waste that occurs in tandem with the transport of resources overseas. Every country faces similar waste issues. Our society has members with a wide range of specialities in the fields of waste and material cycles, and collaborates with other societies in the field of waste management and South Korea and China. One of our academic activities that has shown rapid growth of the last year is the number of articles submitted to the English version of our journal, in particular, dealing with waste management issues in the Asian region. This is an endorsement of the society's role as an information hub in this sector, and of the expectations placed on it in this regard. With this, we intend to continue to grow internationally as a society of experts in waste and 3R related fields.

Moreover, we are still only part way along the path to reconstruction from the 2011 Tohoku earthquake and many issues remain to be overcome. It is with my sincerest hopes for the improvement in the basic societal and livelihood needs of those in the disaster affected regions that I deliver my New Year's greetings.

(Akiko Kida)

We're all waiting for this kind of waste collection!

Kyoto city has already started a trial collection of hazardous and toxic wastes.

Report of the International Session of the 23rd JSMCWM Conference

Japan-Korea International Symposium and International Hybrid Session were held at the 23rd JSMCWM conference, October 22, 2012 in Sendai City, in the northeast of Japan. Sendai City, the central city of Tohoku region, was devastated by the tsunami of the Great East Japan Earthquake, and is famous for zelkova trees. The venue was at Sendai International Center at the foot of Aoba castle.

"International Symposium"

The theme of the symposium was "disaster waste management." This important theme has been discussed between Korea and Japan since the symposium held last spring in Wonju, Korea.

Since the earthquake, the countermeasures for disaster waste have been reviewed in Japan and in various academic societies and networks of the world. In Asia in particular, the sharing and accumulation of knowledge is underway. Therefore it is appropriate that this conference was held in Sendai, which is still rebuilding from the 2011 earthquake and tsunami. Also, opinions and knowledge were shared on the topic of how to move forward with the issue of disaster waste management, by looking at the situation in each country and internationally, in particular, looking at how to go about this in the Asian region. The conference was co-chaired by Prof. Shinichi Sakai of Kyoto University, chairman of the international committee of JSMCWM(Japan), and Prof. Yong-Chil Seo of Yonsei University, presidentof the KSWM(Korea).

The first lecture was by Assistant Prof. Misuzu Asari of the Kyoto University Environment Preservation Research Center, titled "Disaster Waste Generated from Earthquake & Tsunami and Manual on Separation and Treatment of Disaster Waste." Assistant Prof. Misuzu Asari discussed the making of this manual, as well as the importance of preparing in advance for the management of waste from future natural disasters.

The Manual on Separation and Treatment of Disaster Waste is based on the experience of the rapidly formed Disaster Reconstruction Taskforce that went to the tsunami devastated area immediately following the March 2011 earthquake in northeast Japan. It comprises advice from experts all over Japan on the various waste management issues that arose during the recovery. The manual is intended not only to be an aid to those dealing with the Great East Japan earthquake, but also to future disasters(earthquakes, tsunamis, etc.).

The manual also calls for the need to prepare in normal times for all kinds of risks and natural disasters. Being well prepared and establishing the appropriate frameworks to share basic knowledge will mean that the various issues can be overcome in times disasters. Assistant Prof. Misuzu Asari closed by stating her wish was that the manual would serve as a resource not only for Japan, but also for other nations and areas that face the risk of destructive earthquakes and tsunamis.

The second lecture, by Dr.Gil-Jong Oh of the Korean National Institute of Environmental Research, was titled "Disaster Waste Management in South Korea." He covered the legal frameworks regarding natural disasters in South Korea, definitions of natural disasters and disaster relief, and the status of natural disasters and special disaster zones (blizzards, flooding, etc.) in Korea.

Dr.Gil-Jong Oh also explained that a recently developed flood waste management guidelines, which covers establishing measures and standards for safe management of waste, as well as methods for collection and transportation of waste. Regarding treatment method percentages (landfilling, incineration, recycling) for disaster waste generated from 2007 to 2010 in special disaster zones: approx. 60% was landfilled, while approx. 26% was incinerated. Also, for flood waste in 2009, landfilling and incineration accounted for 92%, while recycling made up only a small percentage. Finally, regarding the direction and disaster waste management, he called for the need to develop flood waste management plans for local governments and to develop new guidelines for earthquake waste management.

The third lecture, by Dr.Tomonori Ishigaki, of the National Institute of Environmental Studies, was titled "Report and Proposal for Appropriate Management of Flood Waste; Cooperative Relationship among Pluvial Asian Region." Dr.Tomonori Ishigaki stressed the importance of disaster risk management, and reported on various relief measures that the National Institute of Environmental Studies (NIES) conducted following the massive flooding in the Bangkok Metropolitan Administration in Thailand in 2011.

On the subject of disaster risk management, Dr. Tomonori Ishigaki reported on an international conference, called the Sendai Dialogue on Disaster Risk, held in Sendai City on the 9th and 10th of October 2012. He stressed the importance of making society more resilient to disasters, and also the importance of continuous measures and strategies for disaster risk management.

Massive flooding devastated Bangkok from July 2011 until January 2012. NIES, upon the request of the King Mongkut's University of Technology Thonburi, and dispatched a team, NIES-FLOOD Waste Team, to the area. The team held seminars and conducted a survey of the flooding in order to compile guidelines and provide information and proposals on flood waste management. The proposals included: 1) all requirements for flood waste management must be prepared in usual times, 2) communities/local authorities should assess and learn from the 2011 flood damage, and 3) plan for both flood waste management and normal waste management in times of flooding, and 4) disseminate to people the rules and principals such as on source separation, temporary storage and collection, and 5) the effectiveness of recycling in reducing flood waste.

The fourth lecture was by Prof. Yong-Chil Seo of Yonsei University, South Korea, titled "Analysis of Flood Debris using the Annual Reports on Natural Disasters in Korea," reported on the analysis results of natural disasters of the last 10 years in Korea.

Korea is struck by numerous natural disasters every year such as heavy rains and snow storms and typhoons. The debris left by these natural disasters seriously affects the country both socially and financially. Over the last 10 years 94% of disaster recovery spending has been on typhoons and heavy rains. Also there is concern that waste debris volumes have greatly increased since 2006. The volume of debris was 10,000 tons in 2006 and has been increasing every year, reaching approx.110,000 tons in 2011. In the past however, Typhoon Rusa, 2002, generated 980,000 tons of disaster debris.

Recovery costs depend, of course, on the volume of disaster debris generated, and also on the place (mountains: landslides, sediment flows; coastal: tsunami sedimentation etc.) and topography. Prof. Yong-Chil Seo also introduced guidelines on disaster management and methods of waste separation in the event of a disaster, and examples of major disasters in Korea and Japan and U.S.A.

"International Hybrid Session : Short Oral Presentation"

This was held in hybrid format, with, as in the past, oral presentations in English first, followed by poster presentations. It was hosted by Dr. Masato Yamada of NIES, and there was lively debate amongst the 24 participants (2 cancellations of 26 entries). While some participants froze up at times, possibly of nervousness, others spoke freely and had to be reminded by the MC that their allotted 90 seconds was up. There were many diverse opinions expressed. Six of the topics were on overseas waste management issues such as waste issues following the 2011 in Thai flooding, and waste management in Vietnam. Six topics were on recycling such as biomass and metal recovery. Another seven were on thermal treatment including on bio-oil and management of wastes that contain mercury. Also the three topics covering landfilling regarding gas extraction. Another two topics on hazardous wastes were on radioactive cesium. Nine of the presentations were by overseas guests including those from Yonsei University in Korea.

After the oral presentations the participants moved to another venue for the poster presentations. There were many in attendance from local governments, civic organizations, private sector companies and so on. There were many serious questions and answers exchanged, and warm advice given, in front of the posters and booths, which attracted many people. Prizes were given for the best posters, the top three were:

・FB-4 Feasibility of hydrothermal treatment for recovery of liquid fertilizer from
scallop entrails, by In-Hee Hwang (Hokkaido University)
・FB-6 A Study on anaerobic co-digestion using biomass waste,
by Yifei Sun (Beihang University)
・FC-7 Stabilization assessment of waste containing asbestos treated by melting technology, by Jun Kyung Park (Yonsei University)
Also a field trip was held with those involved with running the international symposium and the president of KSWM . They visited two disaster waste disposal sites, one in the Ido District of Sendai City, and the other in Watari District of Miyagi Prefecture. The field trip was highly educational, much like the saying "a picture is worth a thousand words".

Poster session

Field trip to Ido disaster waste disposal site

(Susumu Yoshida and Mamoru Inoue)

The act for the promotion of used small electrical and electronic equipment recycling

The new recycling act was passed at the 180th Session of the Diet in August 2012, and the government plans to enforce the new system from April 2013.

Japan already has a system to recycle large home appliances such as TV sets, refrigerators, air conditioners and washing machines. Personal computers and mobile phones have been collected by producers' voluntary recycling schemes. However, there was no legal recycling system for small electronic devices such as mobile phones, digital cameras and game consoles.

Approximately 40 percent of small electric and electronic equipment (SEEE) are now being landfilled by municipalities as general household waste (Fig.1). Because municipalities can only recover limited amount of steel and aluminium, most of valuable metals such as gold, copper and rare metals are being landfilled. The new act aims to utilize resources and appropriate disposal of waste SEEE.

The new system is very much different from the previous system for large appliances. First of all, the new system is not based on EPR (Extended Producer Responsibilities); rather it uses market mechanisms to promote recycling. Secondary, the system covers various items which are widely used in households. The target items which are now being considered are as follows.

- Small electrical appliances (microwaves, rice cookers, dish washers, etc.)
- Communications equipment (telephone sets, mobile phones, FAX machines, etc.)
- Electronic equipment (video recorders, digital cameras, CD/MD players, ETC (highway toll payment) devices, etc.)
- Computing equipment (personal computers, printer, monitor, keyboards etc)
- Medical devices (clinical thermometers, sphygmomanometers, and massage and suction machines, etc.)
- Electric bulbs, electric lighting equipment, clocks, game consoles, electric music equipment, electric power tools, etc.

Thirdly, the government is to establish a licensing system for recyclers of SEEE. Businesses who have obtained a license from the competent minister (hereafter, licensed companies) can engage in collection or activities required for recycling without obtaining a license from the local municipality, as is required by the Wastes

Disposal and Public Cleansing Act.

Under the new system, municipalities can decide whether to collect used SEEE or not based on their local capacities. Municipalities may also devise ways to collect SEEE, including placing collection boxes in municipal government offices, schools, train stations, etc. They may introduce a new classification category in garbage collection or run a collection campaign for a limited period of time. The collection also can be through electronic appliance retailers. Based on the request from the municipalities or certified companies, retailers can set up collection boxes to collect unwanted SEEE from customers.

After collecting by the municipalities, licensed companies receive collected items and will extract metals from waste by themselves or by entrusting the extraction work to specialist subcontractors. Because neither producers nor consumers pay recycling fees, designated companies should cover cost from their profits by selling the metals. However, they have to continue to accept collected items from the municipalities even if market prices of metals go down.

In order to keep profitability of the whole system, the government sets a target of 20 percent of the generation from households. For the success of this new system, it is also important to increase the participation of municipalities as well as the collection amount from households.

The government is going to provide subsidies or grants to municipalities to help them set up a collection system. The government has to take necessary measures to ensure that citizens will gain a good understanding of the new system because many SEEE are in "hibernation" (have been kept by households). It is also important to strengthen the monitoring of local markets and border controls to prevent improper export of used SEEE.

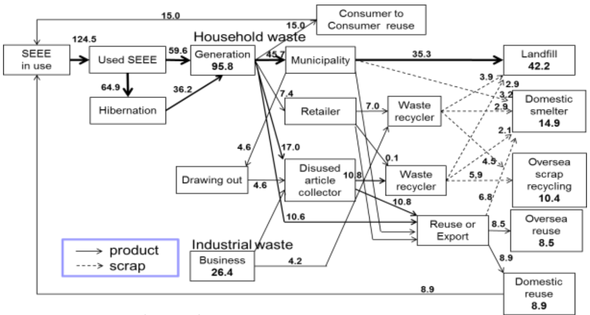


Fig. 1 Material flow of used small electrical and electronic appliances (except personal computers, mobile phones or car items)

Note: The sum of household waste and industrial waste is ***100****.*

Source: Central Environment Council and Industrial Structure Council, http://www.env.go.jp/council/03haiki/y0324-10/mat03-1.pdf

The system will be reviewed every 5 years, just like the other recycling act. If the performance of the system is low, the government will consider amending it to a mandatory system.

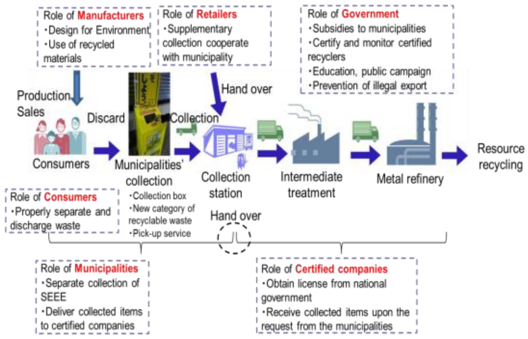


Fig.2 Role of stakeholders under the recycling system of used small electrical and electronic appliances

Source: Central Environment Council, Waste & Recycling committee, Small electric appliance recycling system and recycling of useful metals subcommittee (10th meeting), Document no. 3

(Aya Yoshida)

From SWAPI Expert - A Renewable Resource in Agriculture from Urban Diffuse Pollution in Water -

1. Polluted water as a result of urban diffuse pollutants such as nitrogen, heavy metals, and pathogenic organisms is a serious problem in Thailand. Treatment plants for wastewater purification are one of the best solutions to remedy this chronic situation. This requires an enormous investment. Having treatment plants is not an absolute solution for water pollution problems because the sludge includes urban diffuse substances as by-product of the process. It can be generally assumed that an average of 60 g dry matter (DM) sludge/person/day is produced at simple purification plants (SIRIRATPIRIYA, 1985). All urban diffuse substances such as sludge are increasingly recognized for their potential value in agriculture. It is sensible to pursue the sludge utilization at minimum cost consistent with acceptable environmental impact rather than disposal.

For Bangkok sludge production would be:

60 g x 6,000,000 persons = 360 tons DM/day
Liquid sludge, 5 % DM = 7,200 tons (7,200 m^3)
Dewatered sludge, 20 % DM = 1,800 tons (1,800 m^3)
= 90 transports/day

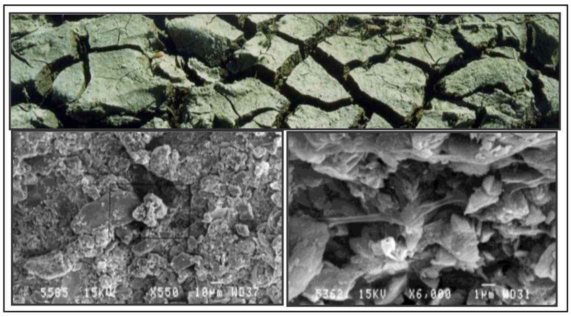
In just one year, Bangkok metropolis will roughly produce 100-150,000 tons of dry matter (DM) sludge.

According to analysis based on the above figures, the sludge would, in total, contain 2,000-4,000 tons nitrogen (N), and 1,000-2,000 tons phosphorus (P). This is a tremendous amount of nutrients. The sludge-N is mostly in organic forms, which will be gradually released. The efficiency of N from organic sources is, however, commonly lower than N-fertilizer, but their N-effect lasts for several years. These nutrients are primarily macronutrients such as N, P, K and trace elements (heavy metals), which are essential elements for plants, such as Cu, Fe, Mn, Zn, however, it also includes toxic elements such as Cd, Ni, Pb. Hence, the sludge can be regarded as a renewable resource for agriculture. Effective and controlled utilization of sludge for agricultural purposes with consideration of long-term and short-term problems seems to be an outstanding solution in a country like Thailand. In a tropical climate the organic matter content in the soil is normally very low. Application of organic matter in the form of sludge is preferable to letting this valuable resource go to waste.

2. Development of technology for controlling nitrogen, heavy metals, and pathogenic organisms in the sludge depends on the method of sludge treatment, toxicity, long-term problems from inorganic contaminants and short-term effect of numbers and persistence pathogens on agricultural land. Long-term problem was clarified by application rate and time interval for reapplying the sludge to agricultural land. The pot and field experiments clarified the fertilizing value of the sludge was equal to and/or higher than that of chemical fertilizer 20-10-10 plus urea (45-0-0) at the rate 500 kg/ha. The optimized s**oil pH** was around 6.5**.** Residue effect and proper frequency to reapply the sludge to agricultural soils was application of sludge 20 tons/ha for both 1st and 2nd harvest. The most effective time interval between applications of sludge to the soils for increasing yield was one growing period of the crop. The heavy metals (Cd, Cu, Fe, Mn, Ni, Pb, and Zn) in sludge of up to 80 tons DM/ha had no significant effect on yield and no phytotoxicity occurred in plants.

The organic content of sludge improves soil structure (fig.1). The most affected soil physical properties are bulk density, aggregation, porosity, and water retention. A decrease in bulk density results in a less compact soil, which provides a better environment for plant growth.

Fig.1: Soil structure improvement after applying sludge



Salmonella, one of the best environmental pathogen indicators, was found at all processes of waste water treatment plant of group B, C and E with serotypes S. Agona, S. Panama, S. Rissen, S. Orion, and S. Anatum. In the sludge, only S. Agona, S. Rissen, and S. Anatum were found. The initial number of salmonella from treatment plant detected by MPN (Most Probable Number) technique was $9x10^4$ cell/sludge 1 kg. After exposure to strong sunshine for one week, no salmonella was detected. The tropical climate of Thailand, with high soil temperature and strong sunshine resulted in ideal conditions for decomposition of sewage sludge in soil, which saves energy for drying and labor.

3. The sludge composition varies very much as a complex mixture of natural organic materials, macronutrients, micronutrients, heavy metals, organic micro-pollutants, and pathogenic organisms. It would probably be more effective to treat each sludge as an individual case. It is necessary to keep in mind that no sludge disposal methods are without risk. Along with scientific knowledge, it is necessary to take into consideration public acceptance, sociological problems, and social attitudes. Sludge resulting from the treatment of urban diffuse pollution possesses advantageous properties such as supporting plant growth and soil amendment on one hand, while having the ability to inhibit plant growth on the other. Utilizing this valuable renewable resource in a controlled manner in agriculture with the appropriate technologies can make the most of such advantageous properties, while setting criteria to limit the disadvantageous properties to within safe dosages.

ACKNOWLEDGEMENT

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(Orawan Siriratpiriya)
The Environmental Research Institute, Chulalongkorn University

Announcement

The 19th symposium on Soil and Groundwater Contamination and Remediation

Date: June 13-14, 2013

Venue:Kyoto University Clock Tower Centennial Hall

Sponsored by: Japanese Association of Groundwater Hydrology, Japan Society on Water Environment, JSMCWM, The Japanese Geotechnical Society, Geo-Environmental Protection Center

Details:
http://www.gepc.or.jp/19kenkyu/19th/index.html

The 12th Expert Meeting on Solid Waste Management in Asia and Pacific Island (SWAPI)

Date: February 26-28, 2013

Venue: Surugadai Memorial Hall of Chuo University, Tokyo

Secretariat: Japan Environmental Sanitation Center

Detail: http://www.jesc.or.jp/en/12th_swapi.html

JSMCWM annual meeting (at Sapporo):
November 2-4, 2013

The 30th anniversary of KSWM
November, 2013

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Current Members of JSMCWM as of December 31, 2012	
Regular Members	2,420
Fellow	26
Senior	18
Honorary member	5
Students	236
Public Institutions	87
Supporting companies	120
NPOs	5
Individual	9
Total	2,926

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Edited and design by: Tsunako Matsumoto, Yuko Aoki
Translation & proofreading: James McLean
Buzen-ya Bldg. Shiba 5-1-9, Minato-Ku,Tokyo 108-0014, Japan
Phone: (+81) 3-3769-5099
Fax: (+81) 3-3769-1492
http://jsmcwm.or.jp/international/
e-mail: international@jsmcwm.or.jp
Readers can find the latest issue of the NEWSLETTER and recent back issues at the JSMCWM Homepage noted above.