NEWSLETTER

No.76 *This Newsletter is a quarterly e-publication.* **April 2011**

JAPAN SOCIETY OF MATERIAL CYCLE AND WASTE MANAGEMENT

Contents

Disaster and Solid Waste Management

"Disasters strike when the previous one is out of mind", uttered a famous Japanese scientist more than a century ago. However, even well prepared people are affected when the magnitude of the earthquake is beyond their imagination. The earthquake, Higasinihon Great Earthquake, and ensuing tsunami that utterly devastated coastal communities in northeastern Japan on the afternoon of March 11th 2011 was of such magnitude.

Firstly, I would like to express my deepest sorrow from the bottom of my heart for the victims and wish to thank the many foreign solid waste management experts who have expressed their condolences to the Japanese people. The actual damage to Japan by the quake is inestimable because it will continue to pose a socially, economically and environmentally heavy burden on the country. However, I believe that the country is determined to fight back and reconstruct the devastated area. I also believe that the solid waste management sector has a huge responsibility and capacity to contribute to the reconstruction of the country because demolition wastes should be appropriately managed.

Modern Japanese society has experienced three earthquakes of catastrophic proportions, starting with the Great Kanto Earthquake, which took place on 1st September 1923. The second, the Great Hanshin-Awaji Earthquake was on 17th January 1995; with the third being this earthquake in 2011. The first great earthquake killed more than one hundred thousand, mostly in fires. As society evolved and technology developed, disaster prevention measures have been taken and most of the houses had been fireproofed by the second great earthquake. However, as its epicenter was directly below the metropolitan area, it caused the loss of over six thousand lives, most in collapsed buildings and some in fires. By the third and most recent great earthquake, architectural standards had been revised, contributing to fewer deaths from collapsed buildings.

Yuriage, Sendai City, Photo by Hiroshi Asanuma

This time, the tsunami was the main cause of damage. Although the government had constructed the world's largest breakwaters in the affected area, extraordinarily high tsunami easily wiped out breakwaters and ravaged coastal communities. The complicated topography of the rias coast, or drowned river valleys, magnified the destructive capacity of this tsunami. The relief and rescue efforts have also been confounded by the

enormity of the disaster, the spread out population, and the number of roads to small settlements that were washed away. Those roads remaining were blocked by destroyed houses, logs, fishing boats and even ships that were washed long distances inland. These debris and inundated fields obstructed rescue vehicles from accessing affected areas.

After the matters of highest priority such as rescue operations and preventing further disasters such as a nuclear meltdown, there will be a need for prompt reconstruction beginning with demolition, clearance and proper disposal of rubble. Without disaster waste management, transportation of relief supplies and rescue equipment, and construction of shelters are unrealistic. Solid waste management experts should share their experiences in such situations to aid in the quick recovery of the affected area. Many Japanese experts experienced the Great Hanshin-Awaji Earthquake, which left a lot of lessons learned in solid waste management.

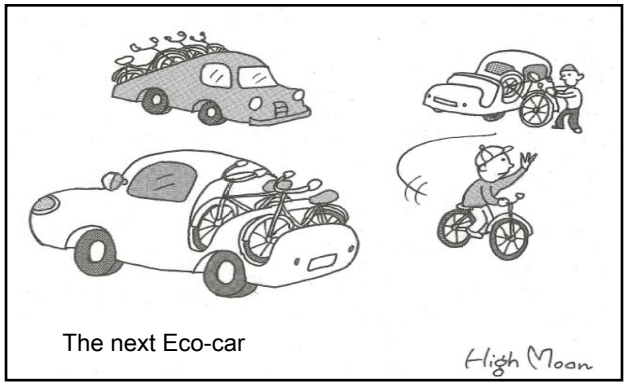
At the time of the 1995 earthquake, nobody was an expert of such situations and management was done on a trial and error basis. The amount of rubble and debris generated within minutes was equivalent to ten years worth of municipal solid waste. Although removal of such waste was indispensable for emergency relief operations, collection vehicles couldn't remove the waste because roads were damaged or blocked. Thus, demolition wastes were temporarily piled up in playgrounds. Nevertheless, there was encouraging support from many municipalities which sent staff and equipment. Temporary incineration plants were constructed to reduce the volume of the waste. In addition, large tracts of sea were reclaimed near the devastated area. In addition a railroad company transported some of this waste to remote incineration plants located more than 500km away.

The Japan Society of Material Cycles and Waste Management has established a "Taskforce on Disaster Waste Management and Reconstruction" headed by Prof. Shin-ichi Sakai, president of the society. The temporary purpose of the task team is as follows;

1. To form an information platform for disaster waste
2. To provide society with a disaster management network
3. To accumulate scientific data on disaster waste and provide basic information for the revision of emergency manuals

Perhaps managing the solid waste generated by the recent earthquake in north-eastern Japan will be the most difficult challenge the Japanese solid waste management sector has ever faced. It may take a significant period of time and enormous effort. I really hope that Japan can conquer this unprecedented peril for the nation and recover herself.

（Hidetoshi Kitawaki）



Author: I wish park and cycle would take root in Japan.

Recycling of small appliances to recover rare metals

A government feasibility study (FS) into a recycling system of used small appliances such as cell phones and game machines has got underway according to a news release in February 2011. This FS picks up from where a study group—on the appropriate collection and treatment of rare metals initiated in 2008—left off. The FS is divided into several subcommittees to consider what should be collected and how, and the role of local authorities and businesses in collection; and is aiming to submit its draft law during the Japanese Diet's regular session next year.

Over the past three years the study group has investigated efficient and effective collection systems, target items, practical collection methods such as from train stations and convenience stores, and communication with citizens and awareness campaigns for higher efficiency with the cooperation of seven local authorities from around the country.

This promotion of recycling was originally started in 2009 as part of a national strategy to secure rare metals, which consisted of four main components: promoting exploration and development, developing alternative materials, stockpiling rare metals, and promoting recycling. This strategy arose out of the risk of rare metals being used as a bilateral political tool because of their uneven global distribution and predicted future shortages. The fact that cell phones contain numerous rare metals has led to them being called “city mines”. Meanwhile, the need for their urgent collection and recycling has been highlighted.

Sustainable, or “eco” cities are proactively implementing pilot projects for the collection rare metals at collection points, administrative offices, convenience stores, group collection, and events by making the most of the characteristics of each area. These local authorities can be characterised by the fact that they are very proactive, and are the home of businesses that have an interest in developing advanced technologies for processing rare metals and businesses that are involved in collecting them from in and around these regions.

The following are excerpts of the study group's mid-term summary.

1. To judge which mineral substances should be targeted for collection it is necessary to consider: industrial needs, scarcity, substitutability, uneven distribution, import dependency rate, size of market, and stability of price and collection technology.
2. It revealed that establishing a recycling system could be economically efficient when a certain collection rate is attained. The necessity of establishing a recycling system needs to be investigated from a cost- effectiveness perspective including securing a stable resource supply and environmental management.
3. As for economic efficiency of businesses, the report indicates that if the recycling is left to market mechanisms, losses would accrue at the stage of collection of small appliances; and intensive collection of rare metals in addition to profitable metals would also reduce the profitability of the intermediate treatment stage and/or the metal collection stage. Thus, in case of being left to market mechanisms, it is assumed that there would be no collection of small appliances for rare metals except as a side to base metal collection. Creation of a recycling system needs to be studied carefully to avoid these problems.
4. To implement the collection of used small appliances, the collection scheme to secure a certain collection rate needs to be studied, including the validity of legislation for collection entities and burden of expenses based on the necessity of political support for system formation and system of economic independence. Also, raising awareness to increase the collection rate needs to be studied. It is essential to further study an efficient, incentive based system to collect rare metals intensively due to the fact that certain processing stages would not be profitable and that intensive collection of rare metals would reduce profitability. Therefore, close cooperation and division of roles based on actors’ proactive work are necessary to be ordered. The appropriateness of proper support measures to those related actors also needs to be studied.
5. Further study is needed on the necessity, methods and cost of environmental management of small appliances which contain hazardous substances.

The study points out that it is necessary, particularly in relation to local authorities, to consider the necessity

of political support for system operation, economic efficiency and legislation regarding collection bodies and cost burden, and collection schemes to secure a certain rate of collection.

The study is now moving into the actual implementation phase. The roles of related actors were discussed at national committees many times. Creation of a respectable system is envisaged that does not excessively burden local authorities as did extended producer responsibility (EPR) of the containers and packaging recycling law. An EPR appropriate for Japan should also be thoroughly discussed among relevant parties.

（Osamu Kawashima）

Application of the Semi-Aerobic Landfill System to Southeast Asia
-A Joint Study between NIES of Japan, and Kasetsart University and Laem Chabang Municipality of Thailand-

Mobile phones in Japan are not merely for making phone calls. You can use your mobile phone to send e-mails, browse websites, listen to music, take photos, find a location, watch TV, find the best train connection and timetable, play games, and even buy a drink. This is an extreme concentration of modern and convenient technologies. However, as you know, Japanese mobile phones are not popular worldwide because the mobile system in Japan was not compatible with other countries and phone vendors had been under careful protection in Japan. As a result the phones came to be compared with the wildlife in the Galapagos Islands, where Darwin discovered several unique evolutionary species in an isolated environment.

The semi-aerobic landfill system (or Fukuoka method) is a traditional engineered landfill technology in Japan. Installation of gas vents and leachate drains into a landfill and maintaining a low water level within a landfill can induce a convectional air flow into the waste body, which is usually at a higher temperature than outside. Oxygen in the air flow can enhance aerobic digestion of organics. The rate of aerobic digestion is faster than the rate of anaerobic digestion. This improves the quality of leachate and accelerates the stabilization of waste. Aerobic digestion of organic carbon produces only carbon dioxide and water as final products, so it is also a mitigation measure for greenhouse gases, i.e. methane emissions from landfills.

Most MSW landfills in Japan have adopted this technology with the support of subsidies. This technology requires lower investment and running costs, easier maintenance, and less energy consumption for pollution controls. It should also be a promising and appropriate landfill technology for developing countries. In fact, there are several semi-aerobic landfills in the world aided by Japan. However, the semi-aerobic landfill system is also not popular on the world stage, and as in the case of mobile phones, it has become another of Japan's "Galapagos" type technologies.

Therefore, the current design of the semi-aerobic landfill is only suited to Japanese conditions, namely, that of temperate climates. As such, it will need adjusting for it to be more applicable overseas. In tropical Southeast Asian countries, the higher ambient temperature would weaken the driving force of the convectional air flow, and the higher precipitation would prevent the penetration of air into the waste body. These barriers should be overcome to release the semi-aerobic landfill from its current "Galapagos-like" constraints to the world.

In 2009, the National Institute for Environmental Studies (NIES) set test cells to demonstrate the semi-aerobic landfill system at a MSW landfill in Laem Chabang, Thailand, in collaboration with Laem Chabang Municipality and Kasetsart University. A semi-aerobic system was installed in one cell, while a conventional anaerobic system was set up in another cell. Each cell

was filled with 7,000 m^2 of MSW from Laem Chabang City. We will compare the internal temperature, water balance, leachate quality, and landfill gas emissions between cells to improve and confirm functions of the semi-aerobic landfill system in tropical climates. Currently, about once every two months, I and staff from my laboratory visit Thailand to survey the Laem Chabang test cells with staff from Kasetsart University.

We have also set lysimeters in the Bangkok campus of the Kasetsart University. The effect of high water content on waste decomposition under tropical conditions will be investigated in detail using 4 lysimeters with different water levels and densities of waste.

Photo: Construction of test cells at Laem Chabang landfill. The black sheet covering the surface is an alternative to daily soil covering to prevent an indescribable odor and many, many, many flies.

These studies are just an initial stage of engineered landfill development in Southeast Asia. We have learned much about local conditions, which we could not have envisaged in our laboratory, from these studies. We have also reconfirmed the fundamentals of landfill study, which should be started from improvement of odor, pests and leachate. We hope that this kind of collaboration will make waste management appropriate and positive, in this region, and that the semi-aerobic landfill will no longer remain a Galapagos phenomenon, but be used around the world. Results from this study will be reported on another occasion. Stay tuned!

(Masato Yamada)

Fostering Japan's venous[1] industry and supporting its overseas expansion

Currently, in developing countries in Asia, sound management of waste cannot keep pace with their rapid economic growth and there is a concern of environmental pollution. Also, there have been reports of inappropriate handling of waste in some developing countries.

Meanwhile, in Japan, the waste management and venous industries have been improving their technology until now to meet the needs of the times. This has resulted in technology advances in the fields of resource recycling and environmental protection. If the Japanese venous industry expands overseas with a focus on Asia, where waste is increasing rapidly, it is expected to contribute to reducing the global burden on the environment.

The Ministry of the Environment newly allocated 600 million yen for the "Project to foster and support the overseas expansion of Japanese venous industry companies" in its FY2011 budget (draft). The total will be 1.3 billion yen—after adding the budget for “Technology development for overseas expansion of the venous industry”, which is allocated as general promotion budget for environmental research—and is expected to fuel such expansion.

This project consists of three initiatives according to the Ministry of the Environment:

1. Establishing a national strategy for overseas expansion of Japanese venous industry companies,
2. Supporting the leading Japanese venous industry companies that have overseas experience or are looking for the chance, and
3. Fostering the next generation of recycling companies

[1] Venous industry is a term coined in Japan that has a wider meaning than recycling industry, meaning an industry for the collection, reuse, recycle and sound disposal of used products. Arterial industry, on the other hand, is that which acquires then processes resources to produce and sell products. This is an analogy to blood flowing away from the heart via arteries, namely selling products, and then flowing back via veins, that is the recycling side of the product cycle.

to lead overseas expansion, after first establishing a recycling system in Japan.

The overseas expansion of Japanese venous industry companies that possess advanced technologies will be supported through the cooperation of the central and local governments and business entities by putting together “packages” of waste management and recycling systems, so they can build up a track record in overseas markets. This push into overseas markets will focus on countries Japan has basic governmental relations with such as Asian nations with a history of bilateral cooperation as well as those taking part in the 3R Promotion Forum.

The Asia 3R Promotion Forum, founded in Tokyo in November 2009 (see Newsletter No. 72, April 2010), held its second meeting last year in Malaysia. This year’s meeting is planned to be held in Singapore. The objective of the forum is to promote high-level government dialogue on the 3Rs (reduce, reuse and recycle) and 3R projects in each country, and sharing information helpful in 3R promotion and networking of the stakeholders.

Six countries in Asia have been aided in creating national 3R strategies through bilateral cooperation since 2005. In addition, memorandums of understanding to further cooperation have been concluded with various Asian countries such as Indonesia and China. For example, the Japanese and Chinese environment ministries signed a memorandum of cooperation on “eco-towns” in Shenyang and Kawasaki cities in June 2009; whereby Japanese companies are conducting a feasibility study on PET bottle and sludge recycling in Shenyang. A memorandum of cooperation was also entered into with the Indonesian environment ministry on hazardous, toxic and solid waste management in October last year. Currently, a feasibility study is underway and a project is being planned for a hazardous waste management system in East Java.

This effort to foster leaders in the venous industry should utilize these frameworks for undertaking feasibility studies (a project's effectiveness at conserving the environment, management methods, necessary expenses etc.) and to facilitate the smooth operation of an enterprise once it's up and running (capacity development and creating frameworks etc.). Also, various activities to lay the groundwork for these initiatives such as promoting and raising awareness (trade expos etc.) of Japan's venous industry in Asian countries, and collecting and analyzing data on the waste amount and methods of disposal in each country so as to be of use to Japanese venous companies when they are considering overseas expansion.

The third initiative, to foster the next generation of private venous companies with proprietary technologies to effectively utilize unused resources so that they can expand overseas will be promoted by:

1. establishing a collection system of wastes that contain resources by citizens, municipalities and the actual businesses that discharge such wastes,
2. establishing resource recovery businesses that can stably supply high value- added products, and
3. supporting the formulation of business models by conducting experimental projects to verify the profitability of collection/resource recovery systems as a whole.

Moreover, the findings and achievements of these initiatives should be widely shared to raise the overall standard throughout the material-cycles sector. Some possible examples are high value-added and low CO2 emitting recycled steel production by upgrading the waste sorting process, used PET bottle collection systems, and low cost and low CO2 emitting production of recycled PET bottles.

These initiatives will also back the establishment of material-cycle businesses that will be actively supported in the industrial waste management sector such as by developing a framework whereby waste producers have social incentives to actively outsource their waste management to leading industrial waste management

companies by making improvements and differentiation in this sector.

Creation of a material-cycle society is a global issue of increasing importance including in developing countries. Japan has a competitive advantage when it comes to overseas expansion with the accumulated experience in the 3Rs and appropriate waste management of the central and local governments and private companies.

On the other hand, the situation overseas is very different to Japan, therefore, these local conditions should be taken into consideration when expanding overseas. This new initiative by the environment ministry is expected to be a turning point for the Japanese venous industry to become active on the global stage.

（Hiroki Hashizume, Masanobu Kimura）

ISWA2011World Congress: Special discount of registration fee for members and extending the abstract application period

Thanks to the generosity of the Korean Society of Material Cycles and Waste Management, all Japanese members can register for the ISWA 2011 World Congress, to be held in Daegu, South Korea from October 17 to 20, for only 400 Euros, rather than the regular 900 Euros, while early registration (up to Aug/15) will be 300 Euros. The deadline for submitting abstracts is extended to March 31. Please join the congress on this occasion.

Material Cycles and Waste Management Research Vol. 21, No.6 (November, 2010)

Preface

Call again Waste Management Experts together

Shinro Urabe

Special Issues: Municipal Solid Waste Incineration Geared toward a Sound Material Cycle and Low-carbon Society

Forward
Nobuo Takeda

Effects of Sorted Collections and Other Measures to Control Waste Volume and Composition in the Incineration Treatment Process
Takashi Nishitani, Atsuyuki Yamauchi and Takashi Nagayama

Wide Area Disposal from the Viewpoint of Waste-based Power Generation
Hiroshi Kogita and Takahiro Masuda

Intermediate Treatment of Municipal Solid Waste in Relation to a Sound Material Cycle and Low-carbon Society
Masaki Takaoka abd Takahiro Masuda

The Potential for Waste-to Energy Contribute toward a Low-carbon Society and Related Issues
Hiroshi Maeda and Naruo Yamagata

Risk Sharing in the WtE (Waste to Energy) Plants Operation Business
Masaaki Nishino and Mamoru Kondo

The Effects of Easing the Self-regulation of Nitrogen Oxides Emitted by MSW Incinerators to Improve Power Generation
Michitaka Furubayashi and Naoaki Yasuda

Material Cycles and Waste Management Research Vol. 22, No.1 (January, 2011)

Preface

The 2011 of Japan Society of Material Cycle and Waste Management for Asian Regional Sustainable Development
Shin-ichi Sakai

Special Issues: Rare Metal Recycling

Outcome of Model Project for the Recycling of Rare Metals
Satoru Morishita

Grade Evaluation of Materials Present in Urban Mines: Total Material Requirement for Recycling
Eiji Yamasue, Ryota Minamino, Hideyuki Okumura and Keiichi N. Ishihara

Analytical Methods for Elements Including Precious Metals and Rare Metals in Electric and Electronic Products
Akiko Kida, Tooru Miyazaki and Hidetoshi Kuramochi

Security Strategy and Recovery Technology for Rare Metals
Shuji Owada and Takashi Nakamura

Crushing and Enrichment through Separation: Urban Concentration Preparingt
Kohmei Halada

Recycling of Rare Earth Magnet from Used Home Appliances
Yoshiaki Atai, Saori Koga, Hisashi Hoshina, Shogo Yamaguchi and Hiroshi Kondo

Pyrometallurgical Recycling Processes for Rare Metals and Platinum Group Metals
Toru H.Okabe and Katsuhiro Nose

Report of the 22st Annual Conference of the JSMCWM
Overview
Report from Special Program
Report from International Session
Report from Planning Sessions by EXCO

Activity Reports from the Regional Chapters

Report on the Technical Seminar of the Kansai Regional Chaptert

Journal of the Japan Society of Material Cycles and Waste Management Vol. 21, No.6 (November, 2010)

NOx Formation/Destruction Characteristics in Sewage Sludge Combustion
Ichiro Naruse, Miwa Hirabayashi, Ryo Yoshiie and Yasuaki Ueki

Treatment and Reforming of Waste Molding Sand Discharged during Casting Process Using High-temperature and High-pressure Water Reaction
Ryuichi Tachibana, Katsumasa Okamoto, Shigeo Nakai, Koichi Fujie, Hiroyuki Daimon

Reaction Rate for the Dechlorination of PCBs Using Microwaves
Kouji Amano, Satoru Kanamori, Mikiko Shimojou and Koichi Itoh

Enzymatic Saccharification of Japanese Cedar Wood by Combined Pretreatments using White Rot Fungus and Oregano-solvolysis with Lactic Acid
Yasunori Baba, Toshiaki Tanabe, Takahiro Watanabe, Yoichi Honda and Takashi Watanabe

Effects of Typhoons on Anthropogenic Beach Litter
Tamon Okano, Motoki Tasumoto and Shigeki Andou

Journal of the Japan Society of Material Cycles and Waste Management Vol. 22, No.1 (January, 2011)

Evaluation the Effects of Alternative Product Consumption Patterns on Material Flow and CO2 Emission in China
Naoki Wada, Yugo Yamamoto, Osamu Saito, Tohru Morioka and Akihiro Tokai

Development of a Separation and Condensation System for Organic Acids from Hydrogen Fermentation Wastewater
Akira Sano and Yuiko Koga

Greenhouse Gas Reduction Utilizing Waste Food and Paper from Municipal Solid Waste
Junya Yano, Yasuhiro Hirai, Shin-ichi Sakai, Shingo Deguchi, Kazuo Nakamura and Hiroaki Hori

Kinetic Study on Volatilization of PbO from CaO-SiO2-Al2O3 Molten Slag Simulation Municipal Solid Waste Melting
Hiroki Kageyama, Takuya Kawachiya, Shouichi Osada, Yuuki Kawaguchi, Mitsuhiro Kubota and Hitoki Maysuda

Independent Disposal of Post-Consumer PET Bottles
Ikuma Kurita

Current Members of JSMCWM
as of February 28, 2011
(The figures in parenthesis indicate the difference from January, 2011)

Regular Members	2,620	(4)
Students	236	(2)
Non-Japanese Member	92	(0)
Public Institutions	92	(-1)
Supporting Members	122	(1)
Individuals of NPOs	6	(0)
Total	3,168	(6)

NEWSLETTER NO.76, April, 2011
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 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.