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# NEWSLETTER

No.52

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April 2005

**THE JAPAN SOCIETY OF WASTE MANAGEMENT EXPERTS**

Dear Waste Management Experts

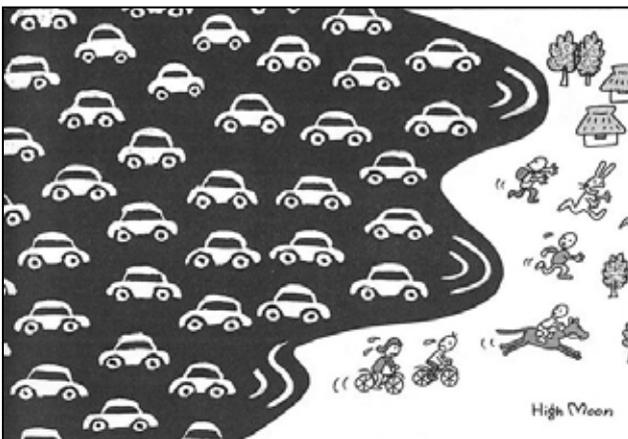
We announce with great sadness that Prof. Nobutoshi Tanaka, JSWME President, passed away on March 10, 2005 despite devoted medical care. He was very eager to develop JSWME with a precise vision for society's role. Known as a prestigious scholar of landfills, he led the members with unique ideas and insight.

In this issue of our Newsletter we report on three topics. The first is about a study on the safe closure of landfills in Malaysia by JICA. After the expiration of operation, landfill sites need an extremely long time for final stabilization. The safe closure and rehabilitation of existing landfills are a wide concern to most countries.

The second topic is the introduction of CITYNET, a network of local governments in Asia and the Pacific region, established in 1987 and based in Yokohama. One of the top concerns of CITYNET has been the insufficient disposal and collection of solid waste. Some activities on technical cooperation among cities of the member countries are reported on.

Biomass technology is coming up in Japan. "Biomass Nippon", a national general strategy, was revealed as a cabinet decision in 2002. This strategy also promotes projects in local municipalities in Japan. In this issue, an activity in Kyoto City, where biodiesel is made from spent vegetable oil, is discussed.

(Hideo Azuma)



Comments by High Moon: "Motorization is rolling onto our society like a tsunami."

Illustrated by Prof. Hiroshi Takatsuki (Taka-tsuki literally means "High Moon".)

**Japan's ODA on Solid Waste Management:  
First-ever JICA Study on Safe Closure and  
Rehabilitation of Landfills (Malaysia)**

Most of the landfills in Malaysia are operated as "open dumps" and for the last 15 years about 60 landfills were closed without proper countermeasures. Therefore, the "safe closure of landfills" and "rehabilitation of closed landfills" are major issues in Malaysia. In order to ameliorate those circumstances, the Japan International Cooperation Agency (JICA) conducted the "Study on the Safe Closure and Rehabilitation of Landfill Sites in Malaysia" over a period of about 22 months (2003-2004), which was JICA's maiden study in the field of safe closure and rehabilitation of landfills.

## 1. Objective and Output

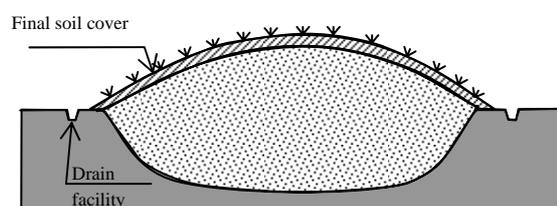
The objective of the study was to reduce the health hazard and/or environmental pollution caused by waste landfill sites. The major outputs included:

- Guidelines on the Safe Closure of Landfills
- Action Plan for Safe Closure Implementation
- Implementation of Three Pilot Projects
- Preparation of Database of Landfill Sites
- Technology Transfer and Enhancing Management/Awareness of Safe Closure

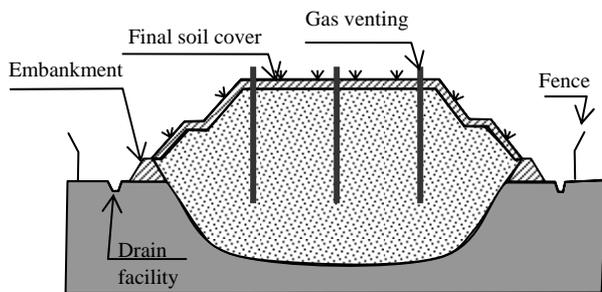
Of the above outputs, this article is dedicated solely to the technical aspects of the guidelines.

## 2. Technical Aspects of the Guidelines

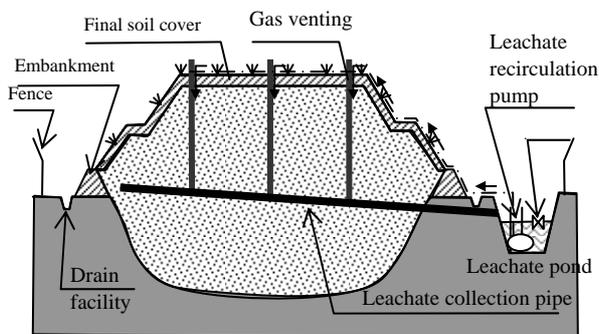
In order to minimize the risks of pollution and hazards caused by closed landfills, which also applies to abandoned landfills, the "Appropriate Technology" ranging from the basic level (C1) to the advanced level (C4) has been set by the JICA study team to be applied to closing landfills safely and to managing those already closed (see figures).



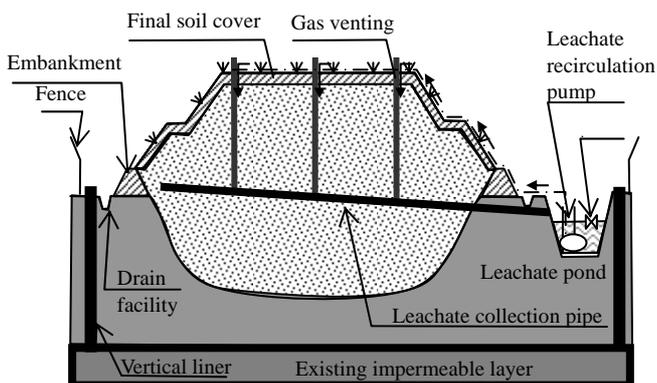
Landfill safe closure level: C1 (Minimal closure level)



**Landfill safe closure level: C2 (Low closure level)**



**Landfill safe closure level: C3 (Middle closure level)**



**Landfill safe closure level: C4 (High closure level)**

Note: For C3 & C4, aerobic area of existing landfill sites will be expanded by safe closure measures.

**Figure: Landfill Safe Closure Levels**

The measures that need to be taken for each of the closure levels are tabulated in the next table.

Measures	Safe closure Level			
	C1	C2	C3	C4
Final cover soil	++	+++	+++	+++
Storm-water drainage	+	++	+++	+++
Safe storage	+	++	+++	+++
Gas vent		++	+++	+++
Leachate		+	+++	+++
Groundwater			++	+++
Early stabilization		+	+++	+++
Post closure measures		+	+++	+++
Monitoring	+	++	+++	+++
Landfill system			Semi-aerobic System	

+: minimally equipped/operated, ++: fair, +++: Fully equipped/operated

### 3. Action Plans

To actualise the guidelines for the safe closure of priority sites, targeting 72 landfills in the year 2010, action plans have been elaborated by the team and are summarised as follows:

- Action 1 : Authorisation of the Guideline
- Action 2 : Closure and post-management
- Action 3 : Establishment of landfill registration
- Action 4 : Arrangement of Federal/State Committee
- Action 5 : Establishment of a funding system
- Action 6 : Development of human resources

(Kenji Igarashi)

**Solid Waste Best Practices Transfer  
– CITYNET Experience –**

### 1. Introduction

CITYNET is a network of local governments based in Yokohama that promotes city-to-city cooperation, mainly among cities and other urban stakeholders in Asia and the Pacific Region. At present, CITYNET has more than 100 members from 20 countries, representing local governments, their national associations, development authorities, NGOs/CBOs, training institutions and private companies.

Through CITYNET, best practices in various urban development fields are transferred from one city to another, to be locally adapted and implemented. The multilateral cooperation that CITYNET facilitates also provides opportunities for the cities and organizations involved to exchange knowledge and personnel under the framework of TCDC (Technical Cooperation among cities of Developing Countries) – the flagship programme of CITYNET.

CITYNET's activities relate to urban concerns faced primarily by cities in the Asia-Pacific. The rapid increase of urban population and limited capacity of local governments in the Region have worsened the situation. Some major urban problems are unemployment, the spread of slums and poverty, inadequate housing, lack of proper water/sanitation facilities, lack of public transportation and traffic congestion, etc. From among these problems, many cities have identified solid waste management as one of their top concerns, especially insufficient solid waste disposal and collection. The volume of waste has been increasing day-by-day and has become a burden for local authorities that often spend between 20-30% of their budget on cleaning services and waste disposal, with around 70% of that going towards

transportation costs<sup>1</sup>. Dhaka City, a member of CITYNET, for example, generated about 3000 tons/day of waste in 2004 and this is predicted to go up to 4,320 tons/day by 2015 - an approximate growth of 3.4%.

## 2. Lessons Learnt from CITYNET

Since CITYNET's establishment in 1987, a series of capacity-building and networking activities have been carried out in the area of solid waste management. This includes a wide range of sub fields, such as garbage collection, recycling, disposal, resource mobilisation and public-private partnerships.

In 1994, CITYNET and UNESCAP conducted a survey on solid waste collection vehicles in various member cities of CITYNET. The survey was undertaken upon the request of Ho Chi Minh City, which was planning to purchase collection vehicles at that time. As a result, the survey helped Ho Chi Minh City as well as other Asian cities to procure vehicles that best suited them at a reasonable price and with easy maintenance.

Another successful example of city-to-city cooperation in the field of solid waste management was between Penang, Malaysia, and Yokohama in the early 1990s. The staff exchanges between Yokohama and Penang resulted in the improvement of data collection in Penang and the start of recycling activities by the Penang Municipality in 1993. A recent survey reveals that the cooperation brought fruitful results. Yokohama was able to transfer portions of its recycling and education programmes (awareness-raising among citizens through leaflet distribution and poster contests) to Penang City.



Photo: Recycled bins in Penang Island, Malaysia

<sup>1</sup> UN-HABITAT, 2001. The State of the World's Cities. Nairobi, Kenya.

The photo below, which was taken in 2002, shows the continuation of this recycling programme in Penang Island.

Another CITYNET initiative is the transfer of community-based solid waste management being practiced by members in Sri Lanka. This successful programme is currently being transferred to cities in other countries, such as the Philippines.

Despite various activities facilitated and organised by CITYNET, solid waste management is still the top priority for activities in the years to come. Therefore, CITYNET recently introduced the "Enviro-Solid Waste Cluster" of members that comprises cities and organisations for whom solid waste management is the key concern. Cluster members meet regularly to set their goals and objectives, and implement the identified action plans in collaboration with each other.

To find out more about CITYNET, please visit its website at: <http://www.citynet-ap.org/>

(Bernadia Irawati Tjandradewi)

### Municipalities on the Move: An Attempt to Use Biodiesel in Kyoto City

Biodiesel is a fuel produced from oil extracted from plants such as rapeseed and soybean by reacting it with methanol so that its viscosity and flash point can be lowered and it can be used by diesel vehicles. Since biodiesel is a substitute for diesel fuel, its use reduces carbon dioxide from petroleum ignition and contributes to the reduction of greenhouse gases. Biodiesel is now widely used especially in the United States and Europe.

Kyoto City processes spent vegetable oil collected from households to produce biodiesel, and uses it as fuel for all the waste collection vehicles and some of the buses in the city. This article introduces this activity.

The process flow of this spent vegetable oil recycling is as follows:

- (i) **Pre-processing:** Eliminate impurities and water from spent vegetable oil that is collected.
- (ii) **Reaction:** Produce methyl esters and glycerin as a byproduct by adding methanol and catalysts to the spent vegetable oil.
- (iii) **Separation:** Separate the methyl esters from the glycerin.
- (iv) **Methanol recovery:** Recover and reuse methanol that has remained in the methyl esters.
- (v) **Water cleansing:** Remove impurities such as free



Photo: Spent Vegetable Oil Recycling Plant in Kyoto

glycerine and the catalysts that have remained in the methyl esters with warm water.

- (vi) **Water removal:** Separate water used for cleansing from the methyl esters.
- (vii) **Additives infusion:** Inject additives to raise the fluidity of fuel under low temperature.
- (viii) **Purification.** Filtrate the methyl esters to remove any dirt, and to produce highly purified methyl esters. This is biodiesel.

The plant can daily produce 5,000 liters of biodiesel and 3,000 liters of a fuel that is a mixture of biodiesel and diesel at the ratio of 2:8. The main features of the plant are as follows:

- (i) Its production scale is the largest among biodiesel plants owned by the local government in Japan.
- (ii) It employs the eight-step process using three tanks and purification is utmost effective.
- (iii) In order to use biodiesel for the city buses, it is equipped with a facility that blends biodiesel and diesel at a certain ratio.
- (iv) Most of the purification process is automated.
- (v) It is also installed with gas detectors, oxygen densitometers, and electrical equipment that are designed to prevent fire. Safety is given due consideration.

Kyoto City, learning from its in-vehicle experience of biodiesel use and taking account of existing standards in the United States and Europe where biodiesel standardization has already started, has established a temporary standard called “the Kyoto Standard”, so that high quality biodiesel can be applied to new model vehicles. The figures of the Kyoto Standard for the pour point and the plugging point were set in view of the lowest temperature in Kyoto.

(Akio Suzuki)

### The 3rd Asia Pacific Landfill Symposium (APLAS Kitakyushu 2004)

The 3rd Asia Pacific Landfill Symposium (APLAS Kitakyushu 2004) was held through October 27-29, 2004, at the Kitakyushu International Conference Center. There were 350 attendants including 64 from 19 overseas countries to discuss the latest technical development and methodology of waste landfilling.

Guests from Italy, China, Korea and Japan delivered a keynote speech and special speeches, in which the approaches and research activities in each country were presented.

In total, about 120 research papers on eight themes were published in the proceedings. In the oral and poster sessions, research activities were presented not only by researchers from the Asia Pacific region but also by those from Europe. The participants listened carefully to the various presentations and there was a lively exchange of opinions.

In addition, private firms and research associations opened 28 booths to introduce their recent research outputs in an exhibition held in parallel.

After the closing ceremony, a facility tour was organized to visit recycling factories and the demonstrative research area in Kitakyushu Eco-town and the recycling works and empirical experiments on the Hibiki-Nada seashore landfill.

In the executive meeting held alongside the symposium, it was decided that the next APLAS would take place in Shang Hai, China, in 2006. APLAS Kitakyushu 2004 was successfully closed with the hope of reassembling in Shang Hai in two years.

(Shinya Suzuki)

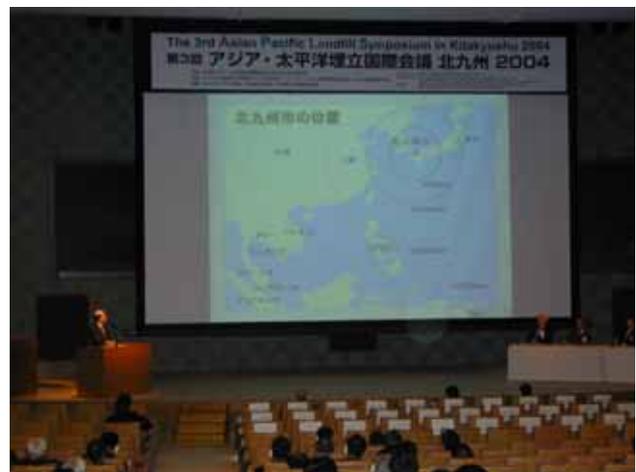


Photo: Kitakyushu City Mayor Mr. Sueyoshi introducing the city at APLAS

**Journal of the Japan Society of Waste  
Management Experts, Vol. 16, No.1 (January 2005)**

Recent issues of the Journal of JSWME contain the following articles. The articles are written in Japanese with the abstract in English.

Paper

***Research on the Recycling Process for Disposed Products Including the Environmental Affects of Scattered Toxics***

Kaduko Nakano, Yasuhiko Wada and Hiroyuki Ohshima

***Abilities of Intensified Humidity-control-charcoal Produced from Wood Waste***

Akio Nakanishi, Motoharu Tamai, Seiki Tanada, Takeo Nakamura and Naohito Kawasaki

***Removal of Nitrogen in the Acidogenesis Phase and Characteristics of Methane Fermentation of Cattle Manure Using the Liquid from that Phase***

Katsutoshi Shibuya and Tatsuya Noike

***A Study on Catalyst Preparation of Dioxin Decomposition***

Katsuhiro Tokura, Kazuyuki Oshita, Tetsuya Yamase and Masakatsu Hiraoka

***Decomposition Behavior of Flame Retardant Plastics Containing Brominated Flame Retardant and Trioxide Antimony***

Yasumasa Yamazaki, Shoji Ozawa, Yoshihiro Kojima and Hitoki Matsuda

***Comparison between Mesophilic and Thermophilic Methane Fermentation Treatments of Manure and Food Waste***

Yukimasa Ogawa, Nasanori Fujita and Yoshiteru Nakagawa

***Effects of Prior Voluntary Recycling on Social Acceptance of Mandatory Resource Separation System***

Kayo Yorifuji, Yukio Hirose, Junkichi Sugiura, Susumu Ohnuma and Yoshiyuki Hagiwara

***Characteristics of Mesophilic Methane Fermentation of High-Solid Content Cow Manure***

Kuninobu Sakurai, Yu-You Li and Tatsuya Noike

**Waste Management Research  
Vol. 16, No.1 (January 2005)**

Preface

***Let's discuss Ideal State of Solid Waste Management in Sustainable Society***

Nobutoshi Tanaka

Special Issues: The 15th Annual Conference of JSWME  
Overviews

Atsushi Terazono

Symposium

***How to Tackle with the Environmental Issues on Solid Wastes – from the Standpoints of Economy, Technology and Religious Ethics -***

Isao Aoyama

***What We Learn from TESHIMA Waste Problem***

Atsushi Terazono

Reports of Each Session

Reports of Each International Session

Reports of Mini Symposia

Review

***Sustainable Landfill Strategies – Literature Review of Approaches to Landfill Research in the West and Japan***

Toshihiko Matsuto and Nobutoshi Tanaka

Current Members of JSWME as of March 31, 2005  
(The figures in parenthesis indicate the difference  
from November 30, 2004)

Regular Members	3,401	(-155)
Students	275	(-38)
Non-Japanese Member	85	(-9)
Public Institutions	109	(-2)
Supporting Members	175	(-6)
Individuals of NPOs	3	(0)
Total	4,048	(-210)

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