

Dear Waste Management Experts

In previous issues, the NEWSLETTER of the Japan Society of Waste Management Experts has been introducing various topics related to waste management in Japan. In this issue we will look outside of Japan by featuring Japan's cooperation with the developing world in the field of waste management.

First, we will do a brief overview of various cooperation schemes and their ideas. Then, we will focus on two of the schemes; study programs in Japan and a development study of waste management. We plan to cover the remaining schemes in following issues.

This issue will also provide insight into recovery and utilization of heat and energy at incineration plants for municipal solid waste, a practice which is becoming more and more popular in Japan. (by Hiroki HASHIZUME)

Japan's International Cooperation in Waste Management

At the Earth Summit in Rio de Janeiro in June 1992, Japan expressed that it would allocate 900 - 1,000 billion yen for its official development aid (ODA) for the environment during fiscal 1992 - 96. On June 30, right after the summit, the government established new "Principles of Japanese ODA". It emphasizes the importance of the following five issues, 1) global environmental problems, 2) basic human needs, 3) human resources development, 4) improvement of infrastructure and 5) structural adjustment.

Based on these five perspectives, waste management in the developing world should be the very issue to be tackled as a target of current Japanese ODA.

Problems of waste management in developing countries are naturally very diverse. In order to meet their needs, various schemes of cooperation are prepared. Two governmental agencies are handling most of Japanese ODA; the Overseas Economic Cooperation Fund (OECF) in charge of loan projects, and the Japan International Cooperation Agency (JICA) responsible for the execution of grant aid projects and technical cooperation.

As of June 1, 1993, seven people from Japan's major municipalities are working as JICA long term experts in Indonesia, the Philippines, Malaysia, Thailand and Paraguay. Most of them are working as advisers to directors of waste management of the central governments or the capital cities of their respective countries. Some of them specialize in preparing waste disposal master plans or are in

charge of waste management education. Occasionally, they plan and hold seminars inviting local and Japanese specialists.

Each year, JICA provides study programs for officials of developing countries. As far as waste management is concerned, each year three courses of 60 - 90 days are open for about 5-15 people respectively. They are carried out by the Japan Environmental Sanitation Center, Kitakyushu City and Osaka City, in cooperation with JICA. Through lectures, laboratory experiments, field practices, study tours and discussion, these courses cover everything from the basic target of waste administration to outlines of various technologies for waste disposal. Besides these group courses, some training programs are provided for individual engineers who serve as counterparts in grant aid projects and development studies, etc. Because these courses are held in Japan, visitors from abroad can see the background of Japanese waste management, such as the nature of Japan, land use, economy, industry, local government, life, culture, etc.

Although many developing countries are definitely in need of improvement in waste management, the real situation of waste disposal is often not grasped, making it difficult to find solutions to problems. JICA's development studies review the existing conditions of waste management in the country/area, propose master plans of waste management, and make feasibility studies for investment projects to improve the situation. Recently, development studies are or have been conducted in such cities as Jakarta (Indonesia), Vientiane (Laos), Guatemala City, Asuncion (Paraguay), Budapest (Hungary) and Poznan (Poland). Sometimes studied projects are implemented as Japanese grant aid or loan projects.

One of the basic philosophies of Japanese international cooperation is to help develop self-help in developing countries. In this regard, the technical cooperation plays an important role to facilitate "software" elements of technical development, such as policy development, transfer of specific technology, human resources development, etc.

However, "hardware" elements such as equipment and facilities for waste management are also lacking in developing countries. Grant aid by JICA and loan aid by OECF are to meet such needs. Projects to which Japanese grant aid can be extended are limited. The recipient country's GNP per capita must be less than US\$ 1,235. The project must be urgently needed and must be completed within a few years. The project cost should be relatively small (0.5 to 1 billion yen per fiscal year). Recently, grant aids for procurement of collection vehicles to Guatemala City, Tegucigalpa (Honduras), Sana'a (Yemen) and Santa Cruz, etc. (Bolivia) and a loan for an incineration plant in Sao Paulo (Brazil) have been provided.

Candidate projects are often prevented from being eligible as loan projects or even as grant aid projects due to such factors as institutional and financial weakness in waste management, often found in national and local governments, and technical and managerial incapability in the recipient waste management bodies for carrying out projects and maintaining facilities and equipment.

Another scheme of cooperation is a "project type technical cooperation". One example is JICA's Water Supply and Environmental Sanitation Training Center in Bekasi, Indonesia, which was built with Japanese grant aid in 1991. There, engineers and technicians have been trained by Indonesian counterpart instructors using equipment installed with Japanese grant aid, together with 7 Japanese specialist advisors.

Waste management is becoming a very serious problem all over the world. For example, waste management and environmental problems in Eastern and Central Europe are two newly recognized issues. It seems that everywhere in the world, especially in developing countries, the waste management sector is one of the weakest sectors in social policy. The bottom line is, incentives to pay for improving waste disposal are not very strong compared with other services like, for example, water supply. On this point, it seems Japan itself has been the same way until quite recently, and maybe is even now. Japan, together with other cooperating countries, must try to find a real solution for waste management in the developing world and for its own sake as well. (by Hiroki HASHIZUME)

**Municipal Solid Waste Management Course Offered
by Osaka Municipal Government**

Osaka Municipal Government held a municipal solid waste management training course for officials of developing countries at the request of the Japan International Cooperation Agency (JICA). This group training course lasted three months from March 1st this year. There were 6 participants from China, the Philippines, Thailand, Peru, Brazil and Egypt. The course focused on practical knowledge and techniques necessary for the improvement of final disposal sites and waste collection.

The training program on waste disposal included lectures on the history of waste disposal in Osaka, landfill operation and maintenance; lectures at Fukuoka University on landfill theory, design exercises and visits to landfill and sea-reclamation sites.

The training program on intermediate treatment included visits to different types of incineration facilities such as a continuous operation furnace, a circulating fluidized bed furnace, a batch furnace, and a bulky waste crushing machine, and a composting facility as well as lectures on incineration facilities suitable for developing countries.

The training program on waste collection and haulage consisted of field observation trips, visits to vehicle maintenance workshops, lectures on time and motion study and vehicle maintenance.

This course also offered lectures on Japanese waste laws, industrial waste, medical waste and hazardous waste including dioxin, as well as a visit to a low level radio active waste management facility.



Osaka City, during the course of development in solid waste management, experienced various problems before the city reached its current advanced stage. For some time after the World War II, Osaka city used handcarts for waste collection and an open dumping system similar to ones currently applied in many developing countries. The experience of Osaka City will help provide people in developing countries with clues to the solution of their own problems.

It is planned that this training program will continue in the future. The next year program will commence in February 1994. (by Minoru SAWACHI & Kiichiro SAKAGUCHI)

**Jakarta Solid Waste Management System
Improvement Project**

In Jakarta Indonesia, a study on urban solid waste management improvement was conducted by JICA in 1987. The study included the preparation of a master plan and a feasibility study. The master plan covers all the five Wilaya (wards) of Jakarta. Several projects in Pusat Wilaya (the central ward) were selected for feasibility studies because improvement in the solid waste management system there was considered urgent.

Consequently, implementation of the following projects was proposed as satisfying the relief of social and environmental impacts and economic feasibility, i.e. i) improvement of the collection system, ii) improvement of road sweeping, iii) construction of a mechanical transfer station, iv) construction of a repair shop for collection vehicles, and v) construction of a large sanitary landfill outside the city. Through these projects Jakarta hoped to mechanize and increase the number of collection vehicles, improve the efficiency of waste haulage system through the use of a transfer station, and solve its problem of lack of adequate landfill capacity within the city by building an inter-municipal landfill in Bekasi, a neighboring city.

The Indonesian government recognized the necessity of the projects and applied to the Overseas Economic Cooperation

Fund (OECF) for a loan to fund a basic design and a detailed design of those projects. The project was forwarded to OECF engineering services in 1991. This was the first case in the solid waste management field where a JICA study lead to implementation utilizing overseas loans. There have been JICA solid waste management studies conducted in eight different countries. Therefore, concerned parties in those countries are paying close attention to the progress of the Indonesian project.

The Indonesian project was entrusted to a joint venture between a Japanese company and three Indonesian companies. It commenced in November 1991 and basic design, detail design, procurement and other tender documents were completed by December 1992. At present, an implementation program is being arranged, including the application for an OECF loan by the Indonesian government. (by Jiro YAMAI)



Note: Garbage truly reflects each country's lifestyle, but a proposal such as this would be sure to be rejected.

By courtesy of Prof. Hiroshi Takatsuki, Kyoto Univ.
(Taka-tsuki literally means High Moon)

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The volume contains the following technical papers.
(Written in Japanese with English abstract)

Vol. 4 No. 2

*Profile of Microbial Numbers and Bacterial Growth Activity
in Composting Process*

by Hidehiro KANEKO, Young Jin BAE and Kenji FUJITA

*Development and Characteristics of the Biomass Pyrolysis
Reactor*

by Hiroshi SHIMIZU, Edwin CARCASONA, Sittisak
UPARIVONG, Rattanachai PAIRINTRA, Osamu KITANI,
Kenzou TANEDA and Yoshinobu OTA

*Qualitative Transformation of Pollutants in Model Solid
Waste Layers*

by Namhoon LEE, Tetsuya KUSUDA, Takayuki
SHIMAOKA, Yasushi MATSUFUJI and Masataka
HANASHIMA

*Extraction Method for AMES Mutagenicity Test of Fly Ash
from Municipal Incinerator*

by Hideyoshi YOSHINO and Kohei URANO

Introduction of Governmental/Semi-governmental Organization Related to Waste Management in Japan (5) Japan Waste Management Association

The starting point of the Japan Waste Management Association can be traced back to 1947, more than 20 years before the enactment of the Waste Disposal and Public Cleansing Law. Having difficulties in coping with increasing municipal solid wastes, a certain number of cities, that assumed full responsibility for public cleansing and disposal of solid wastes, organized a group.

As a consequence of the accelerating transition of the socio-economic situation in Japan, the group has grown to become the Japan Waste Management Association, a public corporation authorized by the Ministry of Health and Welfare and headed by the Governor of Tokyo Metropolitan Government.

It consists of regular members from 1,100 municipalities, supporting members from 130 companies and special members, 90 experts, as of March 1993.

The purpose of the Japan Waste Management Association is:

- (1) To collect constructive opinions, improvement plans and requests from municipalities, and to appeal to the national government as policy-makers, industries and citizens.
- (2) To play the role of a clearing house for information exchange of current problems to be resolved, with timely distribution of findings that are clarified by large scale surveys among members.
- (3) To publish several kinds of publications: The Journal of the Japan Waste Management Association, a 45 year old bi-monthly journal, annual reports, statistics containing solid waste generation amounts, treatment breakdown, facilities, and operating expenses for municipal solid wastes, guidebooks and manuals. (All of these are published in Japanese only.)
- (4) To hold annual conferences, training courses and seminars for professional and operating experts from universities, institutions, and industries.
- (5) To prepare guidelines for technical items compiled by professional experts while examining the outcome of research and development.
- (6) To provide technical guidance for smaller municipalities in planning and building solid waste treatment facilities.
- (7) To contribute to international activities through active participation and cooperation in ISWA, reception of foreign visitors, and information exchange through the dispatch of study groups overseas to see the situation of solid waste management in the rest of the world.

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**A Brief Note on Solid Waste Disposal in Japan (7) -
Utilization of Incineration Heat**

General: There are 1,873 incineration plants owned by local governments in Japan (as of fiscal 1990). These incinerators have an aggregate incineration capacity of 173 thousand ton/day of municipal waste, but the actual incineration amount is about 100 thousand tons/day on average, or 74.4 % of total municipal waste generation. There are a few different types of incinerator such as the continuous operation type, the semi-continuous type, the mechanical batch type and the batch type.

Utilization of Incineration Heat: Incineration heat is utilized mainly in the continuous operation type of incinerator. Most of the continuous type incinerators (about 400) utilize the heat for either internal use or external use. There are 168 continuous type incinerators that supply heat for external facilities (236) located adjacent to the incinerators. The external facilities include 125 welfare facilities, 56 warm water swimming pools, 15 botanical gardens, 14 private firms, 8 sewage or night soil treatment facilities, 7 gymnasiums and 11 others. The most common way of using the heat is for hot water supply. Numbers of the external facilities by type of heat use are as follows: (Some facilities have multiple uses of incineration heat.)

1) Hot water supply:	171	39 %
2) Heating:	133	30 %
3) Air conditioning (cooling):	44	10 %
4) Other purposes:	91	21 %
Total:	439	100 %

The use of incineration heat for regional air-conditioning of local communities is not widespread. There are only 5 areas (2 in Tokyo, 1 in Osaka, and 2 in Sapporo) in Japan where incineration heat is used for this purpose.

Incineration Heat Recovery Rate: It is estimated that 30 % of incineration heat calories are utilized in Tokyo as shown below:

1) Used internally:	22.6 %
2) Supplied to external facilities:	1.4 %
3) Used for power generation:	5.9 %
4) Sub-total (1+2+3):	29.9 %
5) Wasted after used for power generation:	27.9 %
6) Not utilized:	11.9 %
7) Lost:	30.3 %
Total heat calories generated through incineration:	100.0 %

Use of Incineration Heat for Power Generation: There are 113 incinerators (all continuous operation type) that have power generating facilities, of which 53 sell the generated electricity to power companies. The aggregate power generation capacity of the 113 incinerators with an aggregate incineration capacity of 55,560 ton/day reached 348 thousand kw in 1990.

At present, power generation using incineration heat is not financially feasible due to the fluctuation in power generation and the resulting low prices paid by power companies for the electricity. The selling price is as low as 4

- 6 yen/kwh, which is equivalent to the cost of fuel bought by the power companies. Power generation using the incineration heat is economically (but not financially) feasible only in the long term. It may be possible to see that the cumulative economic value of generated electricity (as evaluated at market price) will reach the cost of power generation only towards the end of the life of the incineration and power generation facilities.

In spite of this situation, power generation using incineration heat as well as utilization of the heat for other purposes has greatly increased in Japan over the past 20 years partly due to 1) increase in awareness of the importance of environmental protection through recovery of energy and fuel saving, and 2) the necessity for making incineration facilities more acceptable to residents living nearby by providing incineration-heat-operated-community facilities such as warm swimming pools.

Future Issues: Issues to be addressed with respect to the use of incineration heat will include: 1) development of cost-effective technology of both soft-and-hardware types that would increase the feasibility of use of incineration heat, 2) alleviation of conflict between the original purpose of incinerators (incineration of waste) and the secondary purpose (use of incineration heat), 3) incorporation of the use of incineration heat into regional development plans so as to better match local needs, 4) development and application of methods of economic evaluation of incineration heat recovery for decision making.
(by Yasushi SAKAI & Kiichiro SAKAGUCHI)

**International Session to be Held in
4th JSWME Conference**

The JSWME is going to hold an International Session themed "What is expected of the JSWME by Developing Countries?" on October 14, as one of the key programs of the 4th annual conference of the society.

The session is going to introduce examples of Japanese cooperation to develop improvement plans of waste management, experience as JICA long term expert advisors to developing countries, etc. It is also planned to have a panel discussion on "What is expected of the JSWME by developing countries? How should we respond to the expectations?" The 4th annual conference of JSWME is scheduled to take place during October 13 - 15 in International House, Osaka. (by Hiroki HASHIZUME)

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