NEWSLETTER

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THE JAPAN SOCIETY OF WASTE MANAGEMENT EXPERTS

Dear Waste Management Experts

This issue of the JSWME NEWSLETTER introduces three topics regarding industrial waste management in Japan. First, we will look at the amendment of industrial waste disposal standards. In particular, the strengthening of shredder dust disposal standards from "stable type" to "control type" is epoch-making in the sense that this kind of reclassification has never been done in the past and may be necessary in order to ensure the safety of waste disposal in the future. Second, we will look at current trends in construction and demolition waste management and recycling. Third, regulations regarding industrial waste treatment/disposal facilities will be briefly examined.

Having introduced various governmental and semi-governmental institutions up through the last issue, we will now introduce some universities with programs related to waste management. We hope this provides you with yet another route for understanding Japanese waste management practices. (by Hiroki Hashizume)

Amendment of Industrial Waste Disposal Standards in Japan

Management of Waste Containing 13 Hazardous Substances and Shredder Dust

Addition of "Specially Controlled Industrial Waste"

Since July 1992, wastes leaching or containing mercury, cadmium, lead, organic phosphate, hexavalent chromium, arsenic, cyanide, PCBs, trichloroethylene or tetrachloroethylene as well as inflammable oil, strong acid, strong alkali, infectious waste, PCBs and asbestos waste have been subject to Japanese hazardous waste regulations as Specially Controlled Industrial Waste (SCIW).

On September 26, 1994, an amendment of the cabinet order of the law was promulgated to designate industrial waste leaching or containing 13 kinds of chemical substances as SCIW. This follows amendment of the drinking water quality standards in December 1992, and subsequent amendment of environmental water quality standards, effluent water quality standards, etc. Sludge, waste acid and waste alkali leaching any of the 13 items, cinders and dust leaching selenium more than the level shown in the Table 1 and waste oil containing any of the eight organic halogenated compounds (dichloroethane, etc.) or benzene, were all newly designated as SCIW. The cabinet order will be enforced beginning April 1, 1995.

By so-doing, more stringent controls are to be imposed on the newly designated SCIW; 1) A generator must appoint a SCIW manager who possesses official qualification at every place of generation. 2) SCIW management contractors which can be entrusted by generators mush have a prefectural permit. 3) When a generator entrusts anyone to manage their SCIW, he must issue a tracking document (manifest) to the entrusted party.

Table 1 Newly Added Standards for Verification of Specially Controlled Industrial Waste (SCIW)

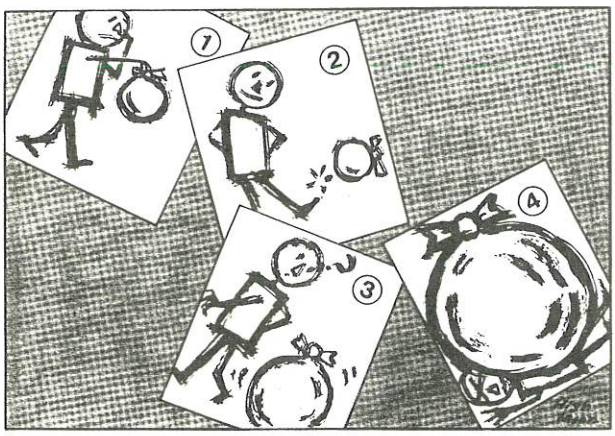
Hazardous Substances	Criteria [mg/liter] (leaching test*)
Dichloromethane	0.2
Carbon Tetrachloride	0.02
1,2-Dichloroethane	0.04
1,1-Dichloroethane	0.2
Cis-1,2-Dichloroethylene	0.4
1,1,1-Trichloroethane	3.0
1,1,2-Trichloroethane	0.06
1,3-Dichloropropene (D-D)	0.02
Thiram	0.06
Simazine (CAT)	0.03
Thiobencarb (Benthiocarb)	0.2
Benzene	0.1
Selenium and its compounds	0.3

* Dilute 100g of wastes with 1 liter of water, and separate the sample solution from slurry, then measure the concentration of the substance in the solution.

Amendment of the Standards for the Disposal of Shredder Dust

As one of the top automobile manufacturing countries, Japan faces various problems related to waste cars, which are currently estimated to number some 5 million annually. One of the recent problems is management of "shredder dust". When cars and some kinds of electrical appliances are disposed of, they are first stripped off any valuable components. Then, they are quite often shredded into very small pieces which are then separated into different fractions such as plastic and metals, typically iron, steel and aluminium. Residues from the shredding and segregation processes mainly consist of plastics and are called "shredder dust (SD)". Because waste plastics are regarded as stable waste, SD has been disposed of at "stable type landfill sites" which don't have leachate management systems.

However, leachate tests by the Ministry of Health and Welfare and the Environment Agency have found such pollutants as lead, mercury, BOD, COD and oil emanating from SD. Because of these findings, the waste disposal standards have been changed so that from April 1, 1995 SD must be disposed of at "control type landfill sites", which are provided with collection and treatment systems for leachate. Disposal of SD may continue until March 31 1996 at stable type landfill sites where SD has been disposed of prior to promulgation of the amendment. At the same time, the government is promoting separation of car batteries, etc., which may have high concentrations of hazardous substances, before shredding, in order to minimize the possibility of pollution. (by Seiji Tsutsui, Takahisa Nishikawa and Hiroki Hashizume)



Revenge of the Refuse Bag

By courtesy of Prof. Hiroshi Takatsuki

Recycling of Demolition Concrete

Construction and demolition wastes are defined as industrial wastes and must be disposed of in a stable type landfill site which needs a permit from the prefectural governor when the site area is equal to or larger than 1,000 m^2. Demolition waste is extremely voluminous and requires huge capacity landfills. Demolition wastes are easily dumped illegally because construction sites are always moving and the generators are sometimes difficult to identify. Because there are many construction and demolition sites along roads in Metropolitan areas, cities must determine how best to reduce construction wastes through intermediate treatment and recycling.

"The Law to Promote the Use of Recycled Resources" was therefore enacted on April 23, 1991. This law has a section to deal with these problems. The law designates demolition concrete as a "sub-product" of construction, and requires builders with over 5 billion yen (about 50 million dollar) of business to utilize recycling facilities and to use recycled materials (pulverized demolition concrete).

The total amount of industrial waste in Japan was 398 million tons in fiscal year 1991 and 77.1 million tons, 19 % of the total, was from the construction business. This amount is the third largest next to manufacturing wastes (144 million tons) and agricultural waste (77.5 million tons). Construction and demolition wastes include sludge from tunnel construction, demolition concrete, waste metals, waste plastics, waste lumber, glasses, ceramics, mixed wastes difficult to separate from building demolition, and demolition asphalt from road construction. In Tokyo, the total amount of demolition concrete and construction sludge was 9.17 million tons in fiscal 1992 which accounted for 78.5 % of the total industrial wastes, except sludges from sewage treatment plants and water purifying plants. It was about 4 times greater than the industrial wastes from manufacturing industries.

The present situation of treatment of construction and demolition wastes in the Kanto area - Tokyo and six neighboring prefectures - is shown in Fig. 1. Demolition concrete has a high recycling rate, about 70%. On the other hand, construction sludge and mixed wastes have much lower rates. The "Recycle 21 Plan" prepared by the Ministry of Construction is currently underway. The target of the plan is to achieve 100% recycling of demolition concrete.

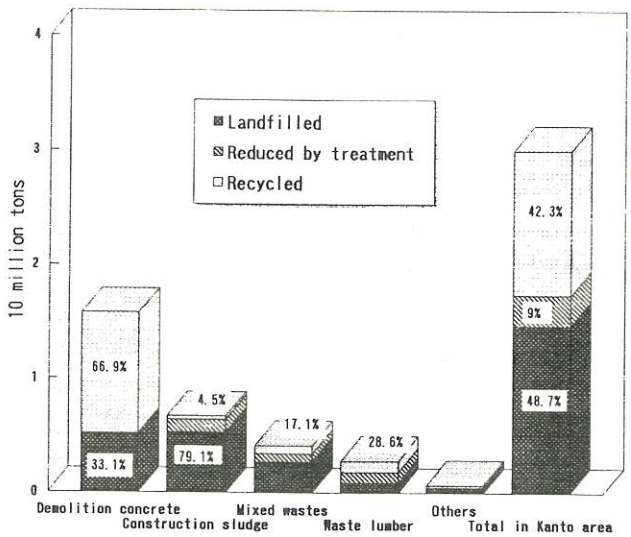


Fig. 1 Management of Construction Wastes in Kanto Area Fiscal Year 1990

The process used is only to pulverize demolition concrete and segregate it by using crusher plants. In Tokyo there are 24 licensed crusher plants with a total capacity of 16,550 ton/day. Products from these plants are sand and crashed stones which are used for subgrade materials, aggregate asphalt mixture and so on. However, these products suffer from weak demand for aggregate use. This means their quality is not yet acceptable to the construction industry.

Competitiveness of these products will increase through the improvement of crusher plants and the preparation of standards for recycled materials. Construction rules should also be reformed to encourage the use of recycled products especially in public works. Control and guidance by local governments is still necessary to prevent illegal dumping in the name of recycling. (by Hideo Azuma)

A Brief Note on Solid Waste management in Japan (11)
- Industrial Waste Landfill Sites -

In fiscal 1991 the total amount of industrial waste generated reached 398 million tons throughout Japan, an increase of 1% from the previous year. The waste disposal flow is shown in Fig. 2. 91 million tons were landfilled.

The Waste Management Law requires landfill sites exceeding a certain scale to be issued a construction permit from the prefectural governor. Table 2 shows the number of landfill sites as of April 1992 for which the permit was issued. There are three types of landfill sites, namely, the strictly controlled type, the control type and the stable type (Fig. 3, 4, 5). Strictly controlled type landfill sites, designed to isolate waste from the external environment, hold waste which may leach hazardous materials such as heavy metals at levels exceeding the maximum allowable limit even after being treated. Control type landfill sites are facilities with an area of over 1,000 m^2 that are designed to hold waste which may leach hazardous materials but at levels below the maximum allowed. Stable type landfill sites are facilities with an area of over 3,000 m^2 meant for relatively stable materials such as plastics, glass, china, metal and concrete demolition waste. The technical standards for both construction and maintenance of landfills are set by the Environment Agency and the Ministry of Health and Welfare.

Table 2. Number of Permitted Landfill Sites for Industrial Waste (as of April 1992)

	Owned by			
	generator	management firms	public sector	Total
Strictly controlled type landfill sites	18	17	2	37
Control type landfill sites	190	1,235	65	1,490
Stable type landfill sites	379	509	115	1,003
Total	587	1,761	182	2,530

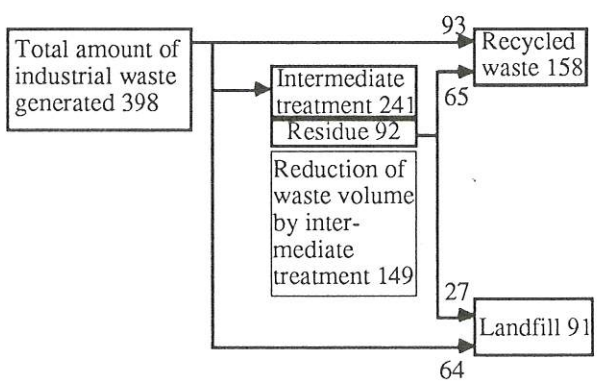
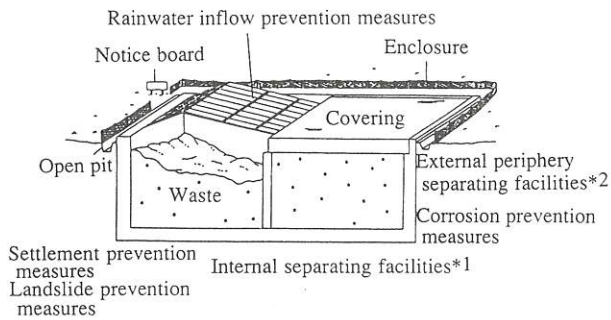


Fig. 2 Industrial Waste Disposal Flow in Fiscal 1991 (million ton)

Aggregate remaining landfill capacity for industrial waste was 176 million m^3 as of April, 1992, which means there was only 1.9 years of landfill capacity left without construction of any new landfills. Because most landfills are operated by private companies and landfill construction frequently meets with opposition from residents, it is argued that the public sector should be more involved in the construction of facilities. Also, more stringent standards are recommended in order to have the facilities more easily accepted by residents.



*1: Made of concrete with a thickness of 10 cm or more and having an unconfined compression strength of 250 kg/cm^2
*2: Made of concrete with a thickness of 15 cm or more and having an unconfined compression strength of 250 kg/cm^2

Fig. 3 Strictly Controlled Type Landfill Site

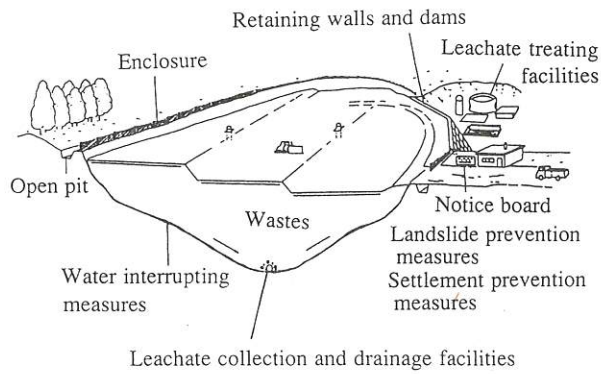


Fig. 4 Control Type Landfill Site

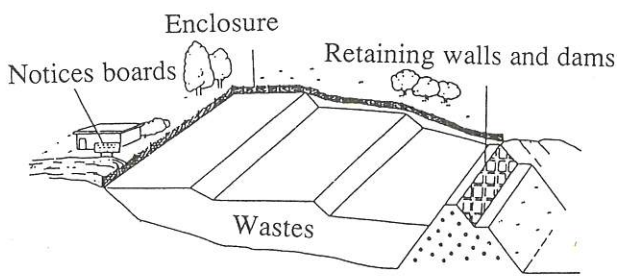


Fig. 5 Stable Type Landfill Site

(by Yasushi Sakai and Ryoko Sugiyama)

Introduction of Universities with Programs Related to Waste Management in Japan (1)

Chair of Solid Waste Control, Dept. of Environmental and Sanitary Engineering, Faculty of Engineering, Hokkaido University

Hokkaido University is comprised of 12 faculties and several research institutes. It is one of the best universities in Japan. The main body of the university is situated in the northwestern parts of Sapporo (43 N 140.5 E; pop. 1.70 million). The campus covers about 300 hectares. The total number of students is about 15,000, including about 400 foreign students. The faculty of Engineering is comprised of 15 departments with about 2,500 students and about 100 foreign students. The Department of Environment and Sanitary Eng. is comprised of 8 chairs: Water Works Eng., Sewage Works Eng., Water Quality Eng., Process Equipment for Sanitary Eng., Industrial Health Eng., Urban Env. Engineering, Solid Waste Control and Air Pollution Control. It has 120 undergraduate students, 60 graduate students in the master's course and 11 graduate students in the doctorate course. The chair of Solid Waste Control was established in 1975, and is one of the most active groups for research and education in the field of solid waste control engineering science and technology in Japan. The staff consist of professor Nobutoshi Tanaka, associate professor Toshihiko Matsuto, instructor Yasumasa Tojo, and technical staff Takayuki Matsuo. There are 8 senior undergraduate students, 2 research students, 8 graduate students in the master's course, and 4 graduate students in the doctorate course. Four students are from Korea and one from Canada.

The following are recent research topics:

- Municipal solid waste control management planning
- Life cycle assessment for solid waste treatment
- Generation rate of household and industrial waste
- User fees for household wastes to reduce generation
- Resource recovery from household refuse
- Technical assessment of RDF facilities
- Flow, mixing and reaction of gas in refuse incinerators
- Stabilization of heavy metals in incinerator bottom ash by sulfate reduction bacteria
- Environmental risk assessment of vitrified incinerator ash
- Acceleration of removal of organic matters in semi-aerobic landfills
- Behavior of methane gas and others in landfill sites
- Water infiltration and penetration mechanism in refuse and ash landfill layer

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Journal of the Japan Society of WasteManagement Experts Vol. 5 No. 3 (July 1994) &Vol. 5 No. 4 (September 1994)

The volumes contain the following technical papers. (written in Japanese with English abstract)

Vol. 5 No. 3 (July 1994)

Distribution of Sulfate-reducing Bacteria at a Sea-based Solid Waste Disposal Site and Their Role on Insolubilization of Heavy Metal Ions in Leachate
by Kazuhiro Takamizawa, Hiroshi Shamoto, Hiroyuki Horitsu, Keiichi Kawai, Tohru Suzuki, Tomoko Mori, Isao Fukunaga and Hiroshi Iida

Characteristics of Continuous Analyzers for NH_3, in Flue Gas from Municipal Incinerators
by Noboru Tanikawa, Toshio Takemoto, Toshitada Imai and Kohei Urano

The Emissions of Harmful Substances Caused by Bulky Refuse Crushing
by Kenji Yasuda, Michimasa Takahashi and Hidekichi Yoshino

Organic Substances in Leachate from Landfill for Mixed Refuse
by Hiroshi Fukui, Nobuo Awaji and Tomiharu Ito

Vol. 5 No. 4 (September 1994)

Nine-year Weighing Survey on Daily Waste Generation in Three Sapporo Households
by Toshihiko Matsuto, Nobutoshi Tanaka and Takayuki Matsuo

The Emission Behaviors of Nitrous Oxide Caused by Sewage Sludge Incineration
by Kenji Yasuda, Michimasa Takahashi, Iwao Yajima and Mikihiro Kaneko

A Study on the Inhibition of Methane Production by Sulfate Reduction in Sanitary Landfills
by Jung Kwon Kim and Saburo Matsui

Characteristics of the Continuous HCL Analyzer in Municipal Incinerators
by Noboru Tanikawa and Kohei Urano

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