DAMAGE TO SOLID WASTE MANAGEMENT SYSTEMS AND THEIR RECONSTRUCTION IN THE EARTHQUAKE-STRICKEN AREA

by Mr Hiroki Hashizume, Director, Japan Waste Research Foundation
Iidabashi KS Bldg., 2–14 Shimomiyabi–cho, Shinjuku–ku, Tokyo 162, JAPAN
Tel: +81–3–5261–9391 Fax: +81–3–5261–9393

1. Introduction

In an instant, one of the most densely populated areas in Japan became a disaster area on January 17. The predawn Hyogo Nanbu Earthquake killed more than 5,200 people and injured 27,000. More than 107,000 houses and buildings were destroyed or badly damaged and have therefore generated a huge amount of waste, estimated at 18.5 million tons. Fortunately, waste management facilities such as incinerators were not badly damaged. Still, it is anticipated that the amount is so large that its management will be extremely difficult.

2. Waste Generation

Various kinds of waste are being generated in the disaster area; 1) waste discharged from daily life, 2) waste laying on roads, 3) demolition waste of damaged houses and buildings, 4) bulky waste generated because of the earthquake, 5) human excreta and sludge from private sewers (Jokaso), and 6) waste generated from reconstruction activities. According to Hyogo Prefecture, the amount of 2), 3) and 4) (hereinafter the 'earthquake waste') is estimated to be as shown in Table 1.

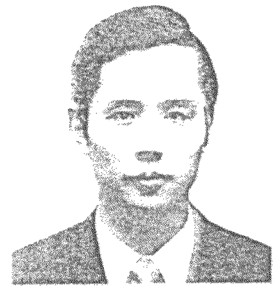
The total amount, 18.5 million tons, is more than a third of the national annual generation of non-industrial waste in Japan.

Table 1 Amount of Earthquake Waste (Source: Hyogo Prefecture)

kind of waste	10^3 tons (10^3 m^3)
houses and buildings	13,000 (12,000)
public facilities	
–roads and railroads	4,800 (3,000)
–houses & apt. houses managed by local gov. or public corp.	700 (500)
total	18,500 (15,500)

3. Management and Disposal of Earthquake Waste

Because the amount of earthquake waste is so large, its disposal must be effective and well planned. Thus, the earthquake waste is being managed in a somewhat different manner than that of ordinary waste. The earthquake waste is to be managed in the following ways: 1) Damaged public facilities are removed and disposed of by the administrators of the facilities; 2) Damaged buildings such as offices of big enterprises are managed by the enterprises themselves; and 3) Damaged houses and buildings are managed by municipalities.



Mr H. Hashizume

A new policy is being applied to management of damaged houses and buildings this time. In past earthquakes, half of the cost for waste transportation and disposal has been subsidized by the Ministry of Health and Welfare. This time, half of the cost of demolishing houses and buildings is also being subsidized. The remaining half is covered by municipality loans, and 95% of their amortization is being granted by the national government.

While all the waste from damaged railroads and half of the damaged national highways had been removed by the end of March, only 27.0% of the damaged houses and buildings (3,580 thousand tons) have been demolished and only 5.1% (671 thousand tons) have been transported. It is estimated that all of the houses and buildings will be demolished and transported for disposal by the end of fiscal 1995 and treatment and disposal will be finished by the end of fiscal 1996.

Because the earthquake waste mainly consists of concrete, metal and wood chips, recycling should be promoted as one of the treatment methods. Table 2 shows the earthquake waste treatment plan.

Table 2 Recycling Targets for the Earthquake Waste (Source: Hyogo Prefecture)

	generation (10^6 tons)	recycling (10^6 tons)	use and recycling targets (10^6 tons)
incombustibles (*1)	15	concrete 11.02	–houses, buildings 6.58 (reclamation 6.39 construction material 0.19) –public facilities 4.44 (reclamation 3.82 construction material 0.62)
		metals 0.45	–houses, buildings 0.28 (materials for iron manufacturing) –public facilities 0.18 (materials for iron manufacturing)
combustibles (*2)	3.5	wood chips 0.08	–houses, buildings 0.08 (materials for pulp, fuel, fertilizer after chipping)
total	18.5	11.56	recycling rate : 62.5%

(*1) Remaining incombustibles are being disposed of at the Osaka Bay Phoenix Center.
(*2) Remaining combustibles are disposed of at inland landfill sites or at the Phoenix Center after incineration, etc.