Development of Criteria for Classification of Disaster Waste in Asia and the Pacific

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Why Do We Need Classification of Disaster Waste?

Background

- Waste classification will contribute to faster treatment followed by quick recovery from disaster
- “Disaster waste management guideline for Asia and the Pacific” was published, which includes the description of waste category (See Table)
- Waste category will be reviewed and updated in the process of the update process of the guideline

Objectives

- To clarify the category for each waste type with consideration of storage, treatment and disposal procedure
- To prioritize the categorized waste

Category of waste generated by disasters in the Guideline

Category	Characteristics of DW	Image	Type of Disaster (✓✓: frequently generated, ✓: generated)			
			Earthquake	Tsunami	Flood	Cyclone
Green wastes	Vegetation such as fallen trees, glasses and timbers		✓	✓✓	✓	✓✓
Building rubble	Timber, wood chips, waste wood (such as column, beam wall-material), bulky items, cables Concrete/bricks *Asbestos should be categorized as Steel, rebar, aluminum material, etc.		✓✓	✓	✓	✓
Household materials	Food wastes, tatami mats, wastes mixed with fibers, paper, wood chips, packaging materials, household furnishing and belongings, other wastes (such as plastics, cardboard, paper)		✓✓	✓✓	✓✓	✓
Mixed wastes	Mixed wastes consisting of a small amounts of concrete, wood chips, plastics, glass, soil and sand, etc.		✓	✓✓	✓✓	✓
Electrical appliances	Televisions, washing machines, and air conditioners discharged from affected houses, which are damaged by disasters and become unusable		✓	✓✓	✓✓	✓
Automobiles	Vehicles, motorcycles, and bicycles that are damaged by disasters and cannot be used		✓	✓✓	✓✓	✓
Vessels	An unusable ship damaged by a disaster			✓✓		✓
Wastes difficult to treat properly	Dangerous goods, such as fire extinguishers, cylinders; and items which are difficult to treat at local government facilities, such as pianos and mattresses (including radiation sources for nondestructive inspection), fishing nets, gypsum boards, etc.		✓✓	✓✓	✓✓	✓
Hazardous wastes	Hydrocarbons, such as oil and fuel; paint; varnishes and solvents; pesticides and fertilizers; medical waste in debris; waste posing healthcare risks; asbestos-containing waste; PCB; infectious waste; chemical substances; toxic substances, such as chlorofluorocarbons, CCA (waste using chromium copper arsenic wood preservative), and tetrachloroethylene; pharmaceuticals; pesticides hazardous waste; solar panels and accumulators; etc.		✓✓	✓✓	✓✓	✓
Mementos, Valuables	Albums, photos, ihai tablets, cash, passbooks, precious metals		✓✓	✓✓	✓✓	✓✓
Industrial wastes, Commercial wastes	Bulky wastes, hazardous wastes, food wastes, marine products and foodstuffs discharged from refrigerators, raw materials and products generated from fishery processing plants and fertilizer factories, machinery, equipment		✓✓	✓✓	✓✓	✓
Tsunami sediment	Sand and sludge sediments launched to land from the bottom of the sea as well as farmland soils by tsunami			✓✓	✓✓	
Sand and stone	Sand and stone launched to land from mountains, rivers and other areas		✓	✓	✓	✓
Household wastes	General and bulky wastes discharged from households		✓	✓	✓	✓
Wastes from evacuation centers	Waste discharged from evacuation centers, waste from relief supplies		✓	✓	✓	✓

Possible Indicators for Classification of Disaster Waste

Hazard

Removing hazards relating to toxicity, explosibility, and infectivity is essential to avoid secondary damage of disasters. It must be considered at any phase of DW management, such as removal, transportation, storage, treatment, disposal.

Emergency

Waste that prevents quick recovery from disaster should be treated with high priority. Stage of recovery is strongly related; Waste preventing the life saving activity at initial phase, and waste preventing the recovery of infrastructure at early-recovery phase.

Feasibility of separation

Classification of waste is not always reasonable. Separation activity requires appropriate clue or perspective to promote the treatment or recycling of DW though sometimes it is decided by separability or existing treatment system.

High-hazard waste is definitely dealt with high emergency.

Reasonable Classification for Situation of Country/Region

SWM system in normal situation is limiting factor for handling of DW

- Capacity of waste management → Collection rate of municipal solid waste
- Possibility of source separation → Source separation in normal situation
- Feasibility of treatment technology → Incineration, Sanitary landfill rate

Indicator	Category A	Category B	Category C
Collection rate of MSW	More than 70%	More than 70%	Less than 70%
Source separation in normal situation	Existence of Source separation	Existence of Source separation	No Source separation
Rate of incineration and sanitary landfill	More than 20% of incineration	Less than 20% of incineration, and more than 50% of sanitary landfill	Less than 50% of sanitary landfill (more than 50% of dumping)

Example of Classification of Each Country or Region

Country – City Name	Collection rate of MSW	Source separation	Incineration /sanitary landfill	Category	Ref: GDP per capita (USD/y/cap)
Indonesia-Jakarta	80%	Yes	-/-	B※	3,975
India-Delhi	76%	Yes	32%/0%	A	2,302
Thailand-Bangkok	100%	Yes	-/-	B※	5,928
Malaysia-Kuala Lumpur	80%	Yes	-/-	B※	11,382
Vietnam-Hanoi	92%	No	5%/-	C※	1,888
Vietnam-Ho Chi Minh City	97%	No	-/-	C※	1,888
Philippines-Cebu	100%	Yes	-/-	B※	2,752
Philippines-Quezon City	100%	Yes	-/100%	B	2,752

Note : ※ In case of no existence of data, it was evaluated based on only existing data.
Data source are data base of world bank, JICA report, Ministry of Environmental in Japan, etc.

Draft Technical Information for Classified Disaster Waste
(1) Concrete and Asphalt Waste -1

(1) General description

Concrete or asphalt waste is generated in the process of construction or demolition as well as disaster. These can be recycled easily and generally considered to be non hazardous and stable. On the other hand, it is necessary to take care of excess loading for the transportation due to high density.

(2) Generation possibility of each waste for each disaster type

Type of disaster	Earthquake	Tsunami	Flood	Typhon/ Cyclone	Volcano
Concrete waste	High	Middle	Middle	Middle	Low
Asphalt waste	High	Middle	Middle	Middle	Low

Draft Technical Information for Classified Disaster Waste
(1) Concrete and Asphalt Waste -2

(3) Hazard

Since it is generated by destruction/ demolition of buildings or structures, safety separation from mixed C&D waste is necessary. Following hazardous substances are paid attention.

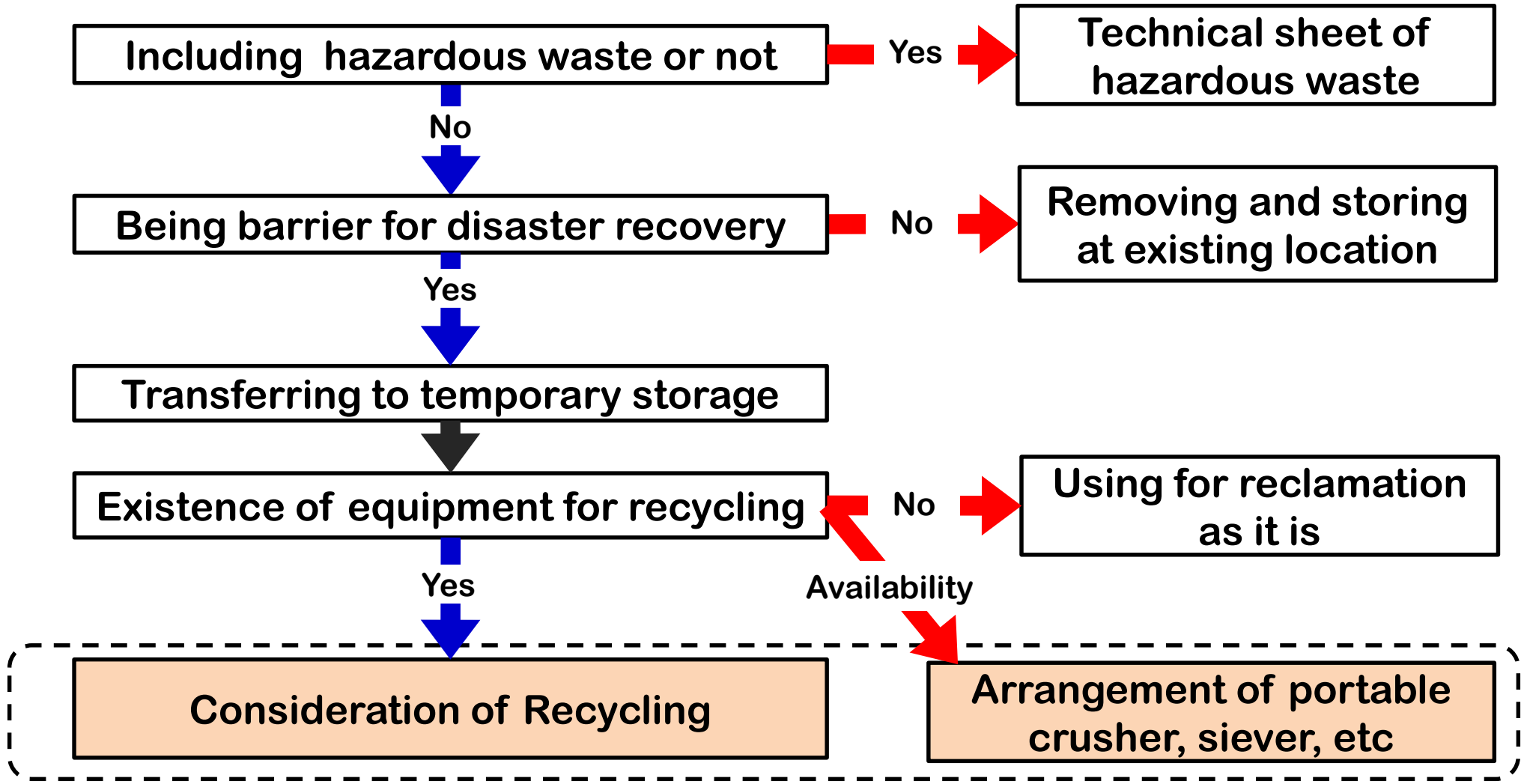
- Materials containing Asbestos
- CCA treated wood (Cr, Cu, As)
- As/Cr containing gypsum board

(4) Emergency

Place for \ Recovery phase	Initial Phase	Emergency phase	Recovery phase
lifesaving, rescue	High	Middle	—
infrastructure recovery, urban restoration	High	High	High
source of drinking water, residential area, shelter etc	Low	Low	Low

Draft Technical Information for Classified Disaster Waste
(1) Concrete and Asphalt Waste -3

(5) Treatment flow



Working Schedule

	Oct. 2018 - Mar. 2019	Apr. 2019 - Sep. 2019	Oct. 2019 - Mar. 2020	Apr. 2020 -Sep. 2020
Criteria for Hazard				
Criteria for Emergency				
Criteria for feasibility of separation				
Country classification				
Technical information for specific waste (phase I)				
Technical information for specific waste (phase II)				