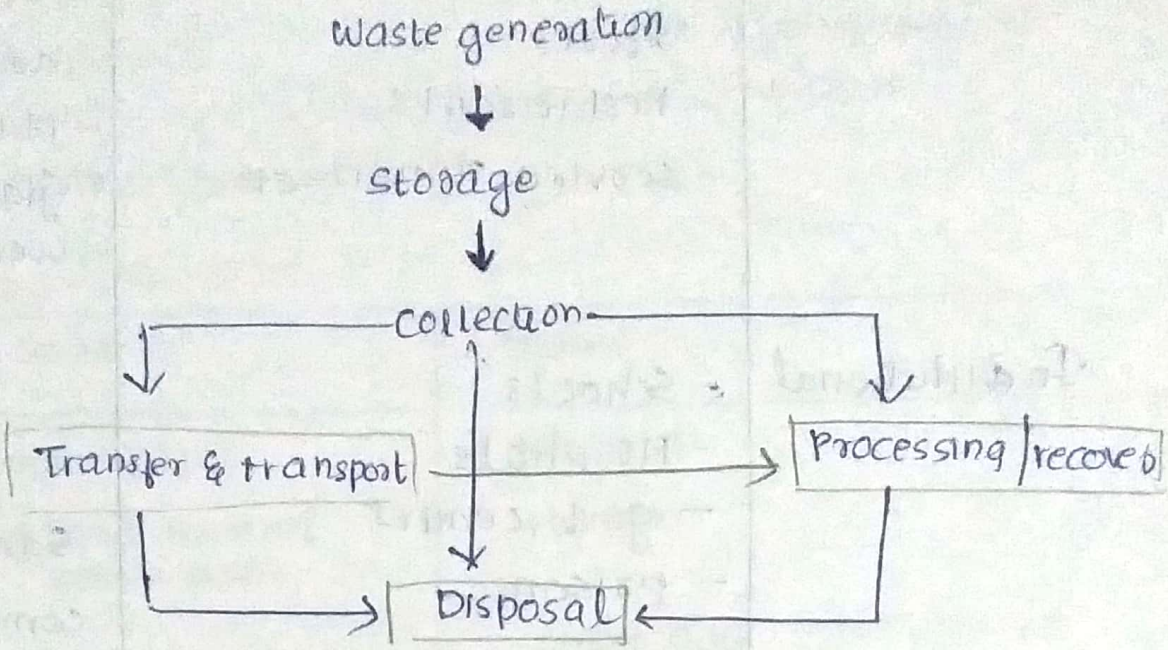
Module-1

Functional Elements of solid waste Management System



Solid waste management may be defined as the decipline associated with the control of generation, storage, collection, transfer & transport, processing & disposal of solid waste involving the best principle of public health, economic, engineering, conservation, Asthetics and other environmental consideration

Sources and Characteristics of waste

Sources	Typical Facilities/Activities location where waste is generated	Characteristics
1. Residential	single family or multi - family buildings, apartement	Food waste Plastic Glass Ceramic Yard waste

Commercial	- Office Buildings - Hotels - Stores - Restaurants - service stations etc	- Food waste - paper waste - cardboard - plastic - glass - woods
Institutional	- Schools - Hospitals - govt centres - prison	Same as commercial
Industrial	- Fabrication - construction - Demolishing - light & heavy manufact using processes - Refinaries - chemical plant, power plant	Hazardous waste

The term MSW is normaly assumed to include all of the wastes generated in a community with the exception of wastes generated by Municipal services, treatment plants, & industrial & agricultural prous

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Categories of waste

1. Industrial
2. Medical
3. universal
4. construction & demolition
5. Radioactive waste
6. Mining waste
7. e-waste
8. Agricultural
9. Municipal

1. Industrial waste

source	waste
→ cement plant	kiln dust
→ coal based thermal power plant	Fly Ash
→ smelting of Cu	Copper slag
→ conversion of Pig iron to steel & Manufacture of Fe	steel & Blast Furnace slag

2. Hazardous waste

wastes that poses substantial danger immediately or over a Period of time to human, plants or animal life are classified as hazardous waste
This is due to physical, chemical, biological or radio active characteristics like ignitability, corrosivity, reactivity and toxicity

3. Medical wastes

Medical wastes are generated by health care facilities like hospitals, laboratory, medical research facilities Dental practices and veterinary clinics

- sharps
- Infectious
- Radioactive
- Geonotoxic waste
- General non regulated / medical wastes

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4 Universal waste

Universal wastes include television, computer and other electronic devices as well as batteries flurecent lamps, Mercury thermostat and other mercury containing equipments.

Electronic devices. It includes any electronic device that is hazardous waste with or without CRT (Cathode ray Tube) including Television, computer, Monitor cell phones, CPUs, Portable DVD players etc.

Batteries : Most household type batteries including rechargable Ni-Cd Batteries, silver button Batteries, Mercury batteries etc. exhibit a charactericcts of hazardous waste

Electric lamps: Floorecent tubes and bulbs, high intensity dischaage lamp, Sodium vapour lamp, electric lamps that contain added Mercury as well as any other lamps that exibit the characteria of hazardous waste

Mercury Containing equipment: Thermometers, Pressure and vaccum gauges, dental amalgam,

CRT (Cathode Ray Tubes): In TV, computer monitor

5 Radio Active Waste

It is usualy the byproduct of nuclear power generation and other applications of nuclear fission or nuclear technology such as research and medicine

Types of Radio active waste:

- very low level waste
- low level
- Intermediate level waste
- High level

* Very low level

consist of demolished material such as concrete, plaster, bricks, metals, valves, Pipes etc produced during dismantling

operations on nuclear, industrial sites and naturally occuring radio active material

* **Low level waste**

produced from electricity generation, diagnosis and treatment of diseases, medical research, Testing of new Pharmaceuticals etc

* **Intermediate / Medium level waste**

- contains higher amount of radioactivity
- Hence requires shielding
- present in chemical sludges, metal fuel cladding etc.

* **High level waste**

- It arises from burning of uranium fuel in nuclear reactor
  or
- produced during reprocessing of used fuels

E-Waste

- E-waste is a term used for electronic products that have become unwanted, not working or obsolete and have essentialy reach end of their useful life.
- It is created from computers, TV, cellphone, printers

Components	Constituents
→ printed circuit board	Pb cd
→ CRTs	PbO, cd
→ switches & Flat screen Monitors	Hg
→ computer Batteries	cd
→ capacitors and transformers	PCB (Poly chlorinated biphynls)
→ cable insulation	PVC

7 **Mining waste**

waste that occur in several stages of mining process throughout the life of mine
- from the 1st exploratn drilling to the last processed material before the mine closure

- waste rock
- Tailings
- Mine water

Mine waste include soil, or overburden rock generated during the physical removal of the desired resource (coals, precious metals, minerals etc) from sub surface

As the ore get processed, the valuable minerals get separate A fine grained mineralsand remains as waste is termed as 'tailings'

In addition heap wastes are also produced during processing of minerals such as smelting operations
Heap wastes are produced when precious metals such as gold, silver, cu etc are recovered from piles of low grade waste rock or tailing by spraying with acid or cynide solutn

8 **construction and demolison** waste (C&D)

waste building material,
Dredging materials that are produced in the process of construction, renovvation, remodelling, repair or demolision of residential buildings, commercial buildings under another the structure and pavements are called C&D waste
It includes

* concrete
* Bricks
* Timber
* sanitary wares
* glasses
* steel
* Plastic tiles etc

9 **Agricultural waste**

Refers to waste produced from agricultural operations including waste from

* farms
* poultry houses
* slotted houses

The largest proportn of agricultural wastes occurs are animal manure and crop residue. However other wastes such as pesticide containers and packaging also contribute to this catagories

problems related to

* odour
* pathogen content
* salt concentratn
* Ammonia productn