

# **SOLID WASTE MANAGEMENT**

Solid waste is the unwanted or useless solid materials generated from combined residential, industrial and commercial activities in a given area. It may be categorised according to its origin (domestic, industrial, commercial, construction or institutional); according to its contents (organic material, glass, metal, plastic paper etc); or according to hazard potential (toxic, non-toxic, flammable, radioactive, infectious, etc).

## **Categories of wastes**

### **1. Organic waste:**

Kitchen waste, waste from food preparation, vegetables, flowers, leaves, fruits, and animal excreta.

### **2. Combustibles:**

Paper, wood, dried leaves, packaging for relief items etc. that are highly organic and having low moisture content.

### **3. Non-combustibles:**

Metal, Tins, Cans, bottles, stones, etc.

### **4. Toxic waste:**

Old medicines, paints, chemicals, bulbs, spray cans, fertilizer and pesticide containers, batteries, shoe polish.

### **5. Recyclables:**

Paper, glass, metals, plastics.

**6. Ashes or Dust:**

Residue from fires that are used for cooking.

**7. Construction waste:**

iron rods, broken concrete etc.

**8. Hazardous waste:**

Oil, battery acid, medical waste, industrial waste, hospital waste.

**9. Dead animals:**

remains of dead livestock or other animals.

**10. Bulky waste:**

Tree branches, etc.

**11. Soiled waste:**

Hospital waste such as cloth soiled with blood and other body fluids.

**12. E-waste:**

TV, mobiles, etc.

**Solid waste disposal:**

The waste generated from residential, commercial and other sectors have become a cause for concern due to the problems associated with their disposal. Therefore, their proper management is extremely important. Improper disposal of solid waste cause air, water and soil pollution, affect health of living organisms causing threat to their survival, etc. Solid waste management: Management of solid waste reduces or eliminates adverse impacts on the environment and

human health and supports economic development and improved quality of life. A number of processes are involved in effectively managing waste for a municipality. These include monitoring, collection, transport, processing, recycling and disposal. Reduce, Reuse, Recycle: Methods of waste reduction, waste reuse and recycling are the preferred options for managing waste. There are many environmental benefits that can be derived from the use of these methods. They reduce or prevent green house gas emissions, reduce the release of pollutants, conserve resources, save energy and reduce the demand for waste treatment technology and landfill space.

Methods like composting, sanitary landfill, pyrolysis and incineration are generally use to manage solid wastes.

### **Sanitary landfill**

This is the most popular solid waste disposal method used today. Garbage is basically spread out in thin layers, compressed and covered with soil or plastic foam. Modern landfills are designed in such a way that the bottom of the landfill is covered with a waterproof liner, which is usually made of several layers of thick plastic and sand. This liner protects the groundwater from being contaminated because of leaching or percolation. When the landfill is full, it is covered with layers of sand, clay, topsoil and gravel to prevent seepage of water. Advantage: If landfills are managed efficiently, it is an ensured sanitary waste disposal method.

### **Constraint:**

It requires a reasonably large area. Incineration This method involves the burning of solid wastes at high temperatures until the wastes are turned into ashes. Incinerators are made in such a way that they do not give off extreme amounts of heat when burning solid wastes.

**Incinerators** that recycle heat energy through furnace and boiler are called waste-to-energyplants. These waste-to-energy systems are more expensive to set up and operate

compared to plain incinerators because they require special equipment and controls, highly skilled technical personnel, and auxiliary fuel systems. This method of solid waste management can be done by individuals, municipalities and even institutions. The good thing about this method is the fact that it reduces the volume of waste up to 20 or 30% of the original volume. Advantage: The volume of combustible waste is reduced considerably by burning waste. In the case of off-site pits, it is an appropriate method to minimize scavenging.

**Constraint:** It can cause smoke or fire hazard and also emits gaseous pollutants. Recovery and Recycling Recycling or recovery of resources is the process of taking useful but discarded items for the next use. Plastic bags, tins, glass and containers are often recycled automatically since, in many situations, they are likely to be scarce commodities. Traditionally, these items are processed and cleaned before they are recycled. The process aims at reducing energy loss, consumption of new material and reduction of landfills. The most developed countries follow a strong tradition of recycling to lower volumes of waste. Advantage: Recycling is environmentally friendly. Constraint: It is expensive to set up, and in most emergencies, there is limited potential.

**Composting:** Due to a lack of adequate space for landfills, biodegradable yard waste is allowed to decompose in a medium designed for the purpose. Only biodegradable waste materials are used for composting. It is a biological process in which micro-organisms, specifically fungi and bacteria, and some arthropods like earthworm, convert degradable organic waste into substances like humus. This finished product, which looks like soil, is high in carbon and nitrogen. Good quality environmentally friendly manure is formed from the compost that is an excellent medium for growing plants and can be used for agricultural purposes. Advantage: Composting is environmentally friendly as well as beneficial for crops. Constraint: It requires intensive management and experienced personnel for large scale operation. Pyrolysis This is a method of solid waste management whereby solid wastes are chemically decomposed by heat

without the presence of oxygen. It usually occurs under pressure and at temperatures of up to 430 degrees Celsius. The solid wastes are changed into gasses, solid residue of carbon and ash and small quantities of liquid. Advantage: This will keep the environment clean and reduce health and settlement problems. Constraint: The systems that destroy chlorinated organic molecules by heat may create incomplete combustion products, including dioxins and furans. These compounds are highly toxic in the parts per trillion ranges. The residue it generates may be hazardous wastes, requiring proper treatment, storage, and disposal.