

SOLID WASTE MANAGEMENT

B.Tech IV Year – Open Elective-II

UNIT – I

INTRODUCTION TO SOLID WASTE MANAGEMENT

1. Solid Waste – Definition

Solid waste refers to unwanted and discarded solid or semi-solid materials generated from human activities. These wastes may arise from domestic, industrial, agricultural, commercial, institutional, and municipal sources.

Examples

- Food waste
 - Paper and plastics
 - Glass and metals
 - Construction debris
 - Industrial sludge
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2. Types of Solid Wastes

(a) Municipal Solid Waste (MSW)

Generated from households, markets, schools, offices, and streets.

Components

- Food waste
 - Paper
 - Plastics
 - Metals
 - Glass
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(b) Industrial Waste

Produced from industries and manufacturing units.

Examples

- Chemical sludge
- Fly ash
- Scrap materials

(c) Agricultural Waste

Generated from farming activities.

Examples

- Crop residues
- Animal manure
- Husk and straw

(d) Biomedical Waste

Waste generated from hospitals and clinics.

Examples

- Syringes
- Bandages
- Human tissues

(e) Hazardous Waste

Contains toxic, corrosive, or flammable materials.

Examples

- Paints
- Batteries
- Pesticides

(f) E-Waste

Discarded electronic products.

Examples

- Computers
 - Mobile phones
 - Televisions
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3. Sources of Solid Waste

Source	Examples
Residential	Food waste, paper
Commercial	Packaging materials
Industrial	Chemical residues
Institutional	School and hospital waste
Municipal Services	Street sweepings
Construction Sites	Concrete and wood

4. Characteristics of Solid Waste

Physical Characteristics

- Density
- Moisture content
- Particle size
- Calorific value

Chemical Characteristics

- pH value
- Carbon content
- Nitrogen content
- Toxicity

Biological Characteristics

- Presence of microorganisms
 - Biodegradability
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5. Properties of Solid Waste

Density

Mass of waste per unit volume.

Importance

- Helps in landfill design
 - Transportation calculations
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Moisture Content

Amount of water present in waste.

Effects

- Increases weight
 - Reduces heating value
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Calorific Value

Amount of heat generated during combustion.

Importance

Used in waste-to-energy plants.

6. Sampling of Solid Waste

Sampling means collecting representative waste samples for analysis.

Methods

- Random sampling
- Stratified sampling
- Composite sampling

Importance

- Determines waste composition
 - Helps in treatment selection
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7. Elements of Solid Waste Management

Functional Elements

1. Waste generation
2. Storage
3. Collection

4. Transfer and transport
 5. Processing
 6. Recovery
 7. Disposal
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8. Integrated Solid Waste Management (ISWM)

ISWM is a systematic approach involving:

- Waste reduction
- Recycling
- Composting
- Energy recovery
- Landfilling

Objectives

- Environmental protection
 - Resource recovery
 - Sustainable development
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9. Solid Waste Management Rules 2016 (India)

Introduced by the Ministry of Environment, Forest and Climate Change.

Key Features

- Source segregation mandatory
 - Door-to-door collection
 - Ban on open burning
 - User fees collection
 - Scientific disposal methods
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