Solid Waste Management - Practical

Lecture 1- Solid Waste Types

What is waste ?
-Unwanted or useless material
-Also called as rubbish, trash refuse, garbage and junk.

What is solid waste?
Non liquid, non-soluble materials ranging from municipal garbage to industrial waste that contain complex and sometime hazardous substances

Introduction to Solid Waste Management

Nature and abundance in different countries depend on :
Geographic location
Climate
Degree of Industrialization
Available resources
Socio-economic conditions
Religious custom
Lifestyle
Behavior of consumers
Season of the year

Types of waste according to properties

Bio-degradable: can be degraded (paper, wood, fruits and others)

Non-biodegradable: cannot be degraded (plastics, bottles, old machines, cans, containers and others)

Sources of Solid Waste
Solid waste sources could be urban or rural area. While rural area generates waste which is often organic rich and easily biodegradable the urban waste is characterized by culture and practices of society.

Different countries adopt different categorisation for statutory requirement. For example, solid waste in Singapore is categorised into three major categories

(1) Domestic refuse (solid waste generated by markets, food centres, households and commercial premises etc.),

(2) Industrial refuse (does not include hazardous and toxic waste which requires special treatment, handling and disposal),

(3) Institutional solid waste (solid waste from government offices, schools, hospitals, recreational facilities etc.).

Industries often struggle to increase profit and reduce waste. Manufacturing sector generates MSW from offices and canteens as well as industrial wastes from manufacturing activities some of which are hazardous. Small workshops spread across the urban/rural area as well as along the highways generate both municipal and hazardous waste which requires treatment and disposal differentially.

Healthcare establishments like hospitals, clinic, veterinary institutions, blood banks, pathological laboratories, diagnostic centres, artificial insemination centres, clinical research centres have multiplied in all countries over the years to generate MSW as well infectious/ chemical/radioactive and sharps.
Construction and demolition sites also produce some MSW like food and office wastes, along with construction and demolition wastes. Households produce construction and demolition wastes during repairs and refurbishment. Residences and commercials activities also generate 'household hazardous wastes' like pesticides, batteries, and discarded medicines. Some cities in the developed nations have waste management systems for each of these categories like hazardous, MSW, infectious separately. Activities like agricultural, mining, and quarrying will generate MSW and non-municipal waste streams.
Treatment of wastewater produces a semisolid, nutrient-rich sludge which is often referred as biosolids. It can be recycled and used to improve soil nutrition of crop land. Biosolids contain about 93–98 % water.

Residential

Waste composes of decomposable food waste, packaging material comprising paper, plastic, old cloth, hazardous waste like old battery, nail polish bottles, insecticides, after shaving lotion, bottle, and biomedical waste like sanitary napkin. Waste quantity varies depending on income and development of the country.

Commercial

Waste composes of decomposable food waste, packaging material comprising paper, plastic, hazardous waste include used batteries, chemical containers. Waste quantity varies depending on the activities and turnover.

Gardens

Waste predominantly composes of garden trimming and leaves. Hazardous chemicals include packaging material of agro chemicals. The waste cold include packaging material like cover used for chips, ice cream cups etc.

Industrial

Waste depends of product of the industry. Industrial waste comprises highly hazardous chemicals to non hazardous packaging material. Quantity of waste depends on quantity and type of product manufactured.

Agriculture and Rural

Waste mainly comprises of rotten vegetable, fruits, leaves and other plant parts. Hazardous chemicals include packaging material of agrochemicals. Most of the waste will be used within the same farm/estate hence quantity is negligible.

Demolition and Construction

Waste mainly comprises of concrete, brick pieces, soil, wood, metals, and other debris. Recyclables material like steel and other metals are recovered by construction/demolition agencies. The quantity depends on size of construction/demolition and construction technology.

Transportation

This category can be included as subcategory of commercial activity. While developed countries do not generate waste along roads and railway tracks. But people throw waste all along roads and railway tracks in developing world. The quantity of solid waste besides railway track depends on the traffic and number of passengers travelled.

Water and Wastewater Treatment Plants

These plants generate hazardous and non-hazardous sledges and packing material. Quantity of solid waste depends on the quality/quantity of water/wastewater treated.

Beaches and Recreation areas

This category mainly contains litters of food wrappers made up of paper, plastic, metal and glass. Quantity of waste depends on number of visitors.

Slum

Slum people generate least quantity among all urban sectors. Since the dwellers are poor they make use of the materials available to maximum extent and sell recyclable fraction. Many of the dwellers depend on waste for livelihood. The waste mainly contains ash and decries which does not have recyclable value.

Fruits and Vegetable Market

Fruits and vegetable market prominently contains decomposable waste like rotten and damaged fruits and vegetables. A small percentage of packaging like cardboard, plastic and paper may be present in the waste. Citrus and other sour fruits like pine apple may add to acidity of the waste.

Slaughter House

Waste mainly comprises of hide, hair, undigested and digested food, bones, and meat. The waste is highly putrescible in nature and likely to have pathogens that could cause zonoses.