Waste Management: Sources, Classification and Disposing Methods of Wastes

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Abstract **- This review highlights the definition of waste management, its characterization and source of wastes. Along this focus the classification of waste products and discuss few methods of disposing waste. Waste management is the collection, transport, processing, recycling or disposal and monitoring of waste materials. The term usually relates to material produced by human activity and is generally undertaken to reduce their effect on health, the environment or aesthetics.**

Index Terms **- Waste management, characterization, sources, disposing methods.**

I.INTRODUCTION

Waste management term usually relates to material produced by human activity and is generally undertaken to reduce their effect on health, the environment or aesthetics. Waste management is also carried out to recover resources from it. Waste management can involve solid, liquid, gaseous or radioactive substances, with different methods and fields of expertise for each.

It also means the administration of activities that provide for the collection, source separation, storage, transportation, transfer, processing, treatment, and disposal of waste. It includes the action to reduce waste, through material efficiency, waste reduction and the recovery and reuse of discarded material. Disposal, processing, controlling, recycling, and reusing the solid, liquid, and gaseous wastes of plants, animals, humans, and other organisms are included in its preview. It includes control within a closed ecological system to maintain a habitable environment.

Waste management practices differ for developed and developing nations, for urban and rural areas, and for residential and industrial producers.

II. CHARACTERIZATION

In order to provide accurate information on the management of municipal waste, it is necessary to understand and quantify its nature and constituents. Waste characterization means finding out how much are the different materials (paper, Glass, food waste, etc) is discarded in the waste sample. Waste characterization information helps in planning how to reduce waste, set up recycling programs, and conserve money and resource.

Local government planners, haulers, and recyclers may estimate the amount of certain materials in their waste. A major part of waste characterization information helps a firm understand what's in their waste streams, a first step in devising ways to reduce waste and cut disposal costs.

Basic information needs include the chemical and physical characterization of the waste, the concentration of the hazardous constituents as well as of the nonhazardous materials that may govern the treatment methodology the inventory of waste on hand, and the waste generation or accumulation rates. Waste characteristics such as flammability and corrosivity are important in prioritization of treatment. For example, placing high priority on the treatment of flammable waste will focus available resources on reducing the potential for liability which could result from the event of accidental fires during storage.

Regular waste characterization surveys at a local level provide up to date information on the composition of household and non-household waste, which in turn is used to calculate national statistics.

Source	Typical waste generators	Types of solid wastes
Residential	Single and multifamily dwellings	Food wastes, paper, cardboard, plastics, textiles, leather, yard fabrication, construction wastes, wood, glass, metals, sites, power and chemical ashes, special wastes (e.g., plants bulky items, consumer electronics, white goods, batteries, oil, tires), and household hazardous wastes).
Industrial	Light and heavy	Housekeeping wastes, manufacturing packaging, food wastes, fabrication. Construction and demolition sites, power and chemical materials, hazardous wastes, plants. ashes, special wastes.
Commercial	Stores, hotels, restaurants, markets office buildings, etc.	Paper, cardboard, plastics, wood, food, wastes, glass, metals, special wastes, hazardous wastes.
Institutional	Schools, hospitals, prisons. govt. centers.	Same as commercial.
Construction and demolition	New construction sites road repair, renovation sites, demolition of buildings	Wood, steel, concrete, dirt, etc.
Municipal services	Street cleaning, landscaping. parks, beaches, other recreational areas, water and wastewater treatment Plants.	Street sweepings; landscape and tree trimmings: general wastes from parks, beaches. and other recreational areas; sludge.
Process (manufacturing, etc.)	Heavy and light manufacturing, refineries, chemical plants, power	Industrial process wastes, scrap materials, off-specification products, slay tailings. Plants, mineral extraction and processing.
Agriculture	Crops, orchards, vineyards, dairies, feedlots, farms.	Spoiled food wastes, agricultural wastes, hazardous wastes (e.g., pesticides).

III. CLASSIFICATION

Waste products differ according to their type and source: For example household. industry, hospitals, agriculture waste etc. Waste is classified by its source and by its properties. Waste is usually classified into-

- *Household waste:* Household and consumer waste is waste produced by households. shopkeepers and trades people. However, it also includes waste from companies and industries when it is not harmful or polluting, such as paper, cardboard, wood, glass, textiles, packaging, etc. This is also known as Municipal waste.
- *Non-hazardous industrial waste:* Non-hazardous or ordinary industrial waste (OIW) is generated by an industrial or commercial activity, but is similar by its nature and composition to household waste. It is not toxic, presents no hazard and thus requires no special treatment. In particular, it includes ordinary waste produced by companies, shopkeepers and trades people (paper, cardboard, wood, textiles. packaging etc). Due to its non-hazardous nature, this waste often sorted and treated using the same facilities as that of household waste.
- *Special waste:* Special waste is household or industrial waste which is hazardous to man and the environment. It may be toxic and special precautions must be taken in treating it. Hazardous waste in particular includes products that are explosive, flammable, irritant, harmful, toxic, carcinogenic, corrosive and infectious or toxic to reproduction.
- *Medical waste:* Medical waste or waste from healthcare activities includes waste produced by hospitals, independent healthcare professions, veterinary medicine, research and manufacturing activities in the fields of human and veterinary medicine.
- Agricultural waste
- Construction waste
- Radioactive waste

IV. DISPOSING MATHODS OF WASTES

For Municipal Solid Waste, source separation and collection followed by reuse and recycling of the non-organic fraction; energy/compost/ fertilizer production of the organic waste fraction via anaerobic digestion is the favored method. The different treatment and disposal methods are-

1. Sanitary Landfill

Disposing of waste in a landfill involves burying the waste, in abandoned or unused quarries, mining voids or pits. A properly designed and well-managed landfill can be a hygienic and relatively inexpensive method of disposing of waste materials.

Poorly designed or poorly managed landfills can create a number of adverse environmental impacts such as wind-blown litter, attraction of vermin (such

as mice or rats), and generation of liquid leachate. Another common by-product of landfills is gas (mostly composed of methane, Hydrogen sulphide and carbon dioxide), which is produced when organize waste breaks down an aerobically. This gas can create odour problems, kill surface vegetation, and is a greenhouse gas.

2. Incineration (Thermal Process)

Incineration is a disposal method which is the controlled combustion of solid wastes so as to convert them into residue and gaseous products. The advantages of incineration is that it is free from corrosion, emission of odours, and also free from bacteria and free from wet organic matter which may be having offensive smell and gases. Incineration and other high temperature waste treatment systems are sometimes described as "thermal treatment" Incinerators convert waste materials into heat, gas, steam and ash, which can be used for electrical generation and domestic heating.

It is recognized as a practical method of disposing of certain hazardous waste materials (such as biological medical waste). Combustion in an incinerator is not always perfect and there have been concerns about pollutants in gaseous emissions from incinerator stacks. Particular concern has focused on some very persistent organics generated such as dioxins and furans which have serious environmental consequences.

3. Pyrolysis

Pyrolysis is a thermo-chemical decomposition of organic material at elevated temperatures in the absence of oxygen. Pyrolysis typically occurs under pressure and at operating temperatures above 430°C (800°F).

In general, pyrolysis of organic substances produces gas and liquid products and leaves a solid residue richer in carbon content to turn waste into safely disposable substances. Anhydrous pyrolysis can also be used to produce liquid fuel similar to diesel from plastic waste.

4- Biological Reprocessing

Waste materials that are organic in nature, such as plant material, food scraps and paper products can be recycled using biological composting and digestion processes to decompose the organic matter. The resulting organic material is then recycled as mulch (material used for soil improvement) or compost for agricultural or landscaping purposes. In addition, waste gas from the process (such as methane) can be captured and used for generating electricity and heat.

Methods of biological decomposition are differentiated as being aerobic or anaerobic methods, though hybrids of the two methods also exist. Anaerobic digestion of the organic fraction of Municipal Solid Waste has been found to be more environmentally effective than landfill and incineration.

5-Avoidane and Reduction Methods

An important method of waste management is the prevention of waste material being created, also known as waste reduction (minimization). Methods of avoidance include reuse of second-hand products, repairing broken items instead of buying new, designing products to be refillable or reusable (such as cotton instead of plastic shopping bags), and encouraging consumers to avoid using disposable products and designing products that use less material to achieve the same purpose.

V. CONCLUSION

Solid waste is one of the important challenges to the environment. Population increase, rapid urbanization, booming economy and the rise in the standard of living have greatly accelerated the rate, amount and quality of the municipal solid waste generation. The most used and cheapest disposal of solid waste is the landfills as waste management techniques. Pyrolysis is thermo-chemical decomposition of organic material at elevated temperature in the absence of oxygen. Waste materials are recycled using biological composting and digestion processes to decompose the organic matter. Waste reduction is one of the important method of waste management is the prevention of waste material being created. Thermal process is one of the methods of controlled combustion of solid waste so as to convert them into residue and gaseous product.

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